RAILROAD GAZETTE

FRIDAY, AUGUST 28.

Train Accidents in July.

The following accidents are included in our record for the month of July :

COLLISIONS.

REAR.

1st, a. m., passenger train on New York, West Shore & Buffalo ran into construction train just going into siding at Catskill, N. Y., wrecking 5 gravel cars.

3d, a. m., passenger train on Union Pacific ran into box car blown out of siding at Mercer, Neb. Engine was damaged, engineer hurt and tramp stealing a ride killed.

3d, night, freight on Cleveland & Pittsburgh broke in two near Salinaville, O., and rear section ran into forward one, wrecking 17 cars.

4th, very early, passenger train on Pittsburgh, Fort Wayne & Chicago ran into special of empty coaches near Leetonia, O., wrecking several cars and injuring 3 trainmen.

4th, a. m., freight on New York, Chicago & St. Louis ran into preceding freight on high trestle near East Springfield, Pa., and several cars were thrown into the ravine below and wrecked, killing 3 trainmen.

4th, p. m., excursion car on Switchback road at Mauch Chunk, Pa., ran into preceding car, which had stopped at the foot of the grade, wrecking the car, injuring 3 passengers fatally and six others seriously.

5th, a. m., freight on Boston & Albany ran into cars left standing on main track at Brighton, Mass., damaging engine and 2 cars.

6th, p. m., freight on Baltimore & Ohio ran into preceding freight near Glenwood, Pa., damaging engine and several cars and injuring engineer.

8th, a. m., passenger train on Virginia Midland ran over misplaced switch and into another passenger train on a siding at Lawyer's Road, Va., damaging both engines and 2 cars.

13th, a. m., freight on Intercolonial road ran into cars broken loose from preceding freight near Coal Branch, N. B., wrecking engine and several cars, killing engineer and fireman and injuring a brakeman.

15th, night, yard engine on New York, Lake Erie & Western ran into rear of passenger train in Buffalo, N. Y., damaging a car.

16th, a. m., freight on Chicago & Grand Trunk ran into preceding freight near Sherlock, Mich., wrecking caboose, killing 1 passenger in it and injuring another.

16th, night, freight on Pittsburgh & Western ran into preceding freight near Zelienople, Pa., wrecking several cars and injuring 2 brakemen.

18th, a. m., passenger train on West Jersey road ran over misplaced switch and into freight cars on siding at Franklinville, N. J. The engine was badly wrecked and 3 cars derailed; the engineer was killed and one passenger slightly hurt.

21st, a. m., passenger train on New York, Susquehanna & Western ran into rear of freight stopped by open draw at Little Ferry, N. J., damaging engine and 5 cars.

22d, p. m., freight on Rochester & Pittsburgh broke in two near Pike, N. Y., and rear section ran into forward one, wrecking several cars.

22d, night, freight on Northern (New Hampshire) road ran into preceding freight near East Andover, N. H., damaging engine and 8 cars. The first train had stopped, but sent back no signal.

23d, very early, freight on Missouri Pacific broke in two near Sedalia, Mo., and rear section ran into forward one, wrecking 5 cars.

24th, night, freight on Illinois Central ran into preceding freight near Paxton, Ill., damaging locomotive and 11 cars, and killing a tramp who was stealing a ride.

24th, night, passenger train on Louisville & Nashville ran into the rear of a freight at Bristow, Ky., damaging 5 cars.

25th, p. m., runaway engine of passenger train on Pennsylvania Railroad ran into preceding passenger train in Harrisburg, Pa., doing some damage.

26th, night, passenger train on Chicago & Grand Trunk ran into the rear of a freight in Lansing, Mich., damaging engine and 9 cars.

29th, p. m., passenger train on Old Colony road ran into rear of freight near North Truro, Mass., damaging 3 cars. Three trainmen were slightly hurt.

BUTTING.

3d, very early, freight on Philadelphia & Reading broke in two at Trenton Junction, N. J., and rear section ran back down grade to Yardleyville and into the head of afollowing coal train, wrecking engine and 7 cars, and injuring 5 trainmen.

4th, a. m., butting collision between two freights on Pittsburgh, Cincinnati & St. Louis, near Columbus, O., wrecked both engines and several cars.

20th, a. m., butting collision between freight and construction train on Grand Trunk, near London, Ont., wrecked both engines and several cars and killed an engineer.

20th, a. m., butting collision between a passenger and a freight train on the New York, Pennsylvania & Ohio, near Ontario, O., wrecked both engines and 11 freight cars. The freight was running against orders.

24th, a. m., butting collision between two freights on Illinois Central, near Kankakee, Ill., wrecked both engines and 16 cars, killed a tramp who was stealing a ride, and injured 4 trainmen.

24th, night, butting collision between freight train and yard engine on Chicago, Milwaukee & St. Paul, in Milwaukee, Wis., damaged both engines and several cars and injured 5 trainmen.

26th, p. m., butting collision between freight and repair train on Rochester & Pittsburgh, near Olean, N. Y., damaged both engines and 5 cars.

CROSSING.

6th, night, freight on Monongahela Division, Pennsylvania Railroad, ran into Pittsburgh, Cincinnati & St. Louis freight at the crossing in Pittsburgh, Pa., wrecking 2 cars.

DERAILMENTS.

BROKEN BRIDGE.

1st, very early, freight on Louisville, New Albany & Chicago broke through bridge near Delphi, Ind., and 12 cars went down, injuring 2 brakemen badly.

6th, p. m., freight on Texas & St. Louis broke through bridge at Saline River, Ark., and engine and 6 cars were wrecked, injuring 2 trainmen.

7th, p. m., freight on New York, Texas & Mexican broke through trestle bridge at Colorado River, Tex., wrecking several cars and injuring conductor.

27th, p. m., trestle bridge on Georgia Pacific, near Muscadine, Ga., gave way under passenger train, the engine and 1 car going down. The engineer and 1 passenger were fatally hurt, 4 other passengers less severely injured.

29th, a. m., passenger train on Texas & Pacific broke through bridge near Plaquemine, La., and the engine went into the bayou.

SPREADING OF RAILS.

13th, a. m., freight on Chicago, Milwaukee & St. Paul was derailed near Eau Claire, Wis., by spreading of the rails.

17th, a. m., 2 cars of passenger train on Connecticut & Passumpsic Rivers were derailed near Barton, Vt., by spreading of the rails, and 5 passengers were hurt.

30th, night, passenger train on Pine Creek road was derailed near Tiadaghton, Pa., by the spreading of the rails.

BROKEN WHEEL.

1st, a. m., 4 cars of freight on New York, Lake Erie & Western were derailed near Sloatsburg, N. Y., by a broken wheel.

28th, p. m., freight on New York Central & Hudson River was derailed near Oriskany, N. Y., by a broken wheel, and 12 cars piled up in a very bad wreck, covering four tracks. A brakeman was hurt.

BROKEN AXLE.

3d, a. m., 5 cars of freight on Ohio Southern were derailed near Springfield, O., by broken axle.

8th, a. m., freight on Pittsburgh, Cincinnati & St. Louis was derailed near Holliday's Cove, W. Va., by broken axle and 16 cars wrecked, killing a trainman and injuring 3 others.

16th, a. m., 4 cars of freight on Terre Haute & Indianapolis were derailed near Coatesville, Ind., by broken axle.

25th a. m., 2 cars ofpassenger train on Boston & Maine were derailed near Dover, N. H., by broken axle.

BROKEN TRUCK.

3d, a. m., freight on Memphis & Charleston was derailed near Chattanooga, Tenn., by broken truck, and a trainman hurt.

14th, p. m., freight on Cairo, Vincennes & Chicago was derailed near Harrisburg, Ill., by broken truck.

ACCIDENTAL OBSTRUCTION.

18th, a. m., 2 cars of freight on New York, Lake Erie & Western were derailed near Howells, N. Y., by a stone which fell from a flat car. A brakeman was killed.

CATTLE.

21st, a. m., construction train on Central Pacific ran over a cow near Truckee, Nev., and was derailed, injuring 2 Chinese laborers.

27th, a. m., repair train on Richmond & Danville ran over a cow near Suwannee, Ga., and several cars were derailed. A car loaded with rails upset, the rails falling on some laborers who were riding on the car, killing 7 and injuring 3 others.

29th, a. m., passenger train on Louisville, New Albany & Chicago ran over a cow near Delphi, Ind., derailing engine and 3 cars and injuring a trainman.

WASH-OUT.

3d, a. m., engine and 16 cars of freight on Kansas City, Springfield & Memphis ran into wash-out near Arcadia, Mo., and were wrecked, killing 3 trainmen.

18th, night, passenger train on Atchison, Topeka & Santa Fe ran into wash-out near Bernalillo, N. M., wrecking engine and 2 cars, killing 4 trainmen and injuring another trainman and 5 passengers.

27th, a. m., freight on Galveston, Harrisburg & San Antonio ran into wash-out near Sierra Blanca, Tex., damaging engine and several cars.

31st, night, freight (with two engines) on St. Johnsbury & Lake Champlain ran into wash-out near St. Johnsbury, Vt., and both engines and 6 cars were piled up in a very bad wreck. An engineer and a fireman were killed and 2 others badly hurt.

MISPLACED SWITCH.

2d, very early, engine and 12 cars of freight on New York, Lake Erie & Western were derailed near Hawley, Pa., by misplaced switch.

3d, a. m., freight on St. Paul, Minneapolis & Manitoba, was derailed in Minneapolis, Minn., by misplaced switch.

14th, very early, passenger train on Chicago, Milwaukee & St. Paul was derailed in La Crosse, Wis., by misplaced switch.

OPEN DRAW.

17th, a. m., freight on Central of New Jersey ran into open draw at Carteret, N. J., and the engine went down into the Rahway River. The fireman was hurt. The usual signals were up, but a fog prevented the engineer from seeing them.

MALICIOUSLY CAUSED.

7th, a. m., passenger train on Addison & Northern Pennsylvania was derailed near Addison, N. Y., by ties placed on the track. Engine upset, injuring engineer badly.

20th, a. m., passenger train on Grand Southern road was derailed near Spruce Lake, N. B., by stones piled on the track.

UNEXPLAINED.

2d, a. m., freight on Charleston & Savannah was derailed near Savannah, Ga. Two trainmen were hurt.

7th, a. m., freight on Cincinnati, Indianapolis, St. Louis & Chicago was derailed near Harrison, O. A car of lime was overturned and 2 colored tramps, who were stealing a ride, were buried under it and badly burned. They will both be blind.

7th, a. m., engine and 1 car of passenger train on Ohio Central were derailed near Bucyrus, O., and fireman was killed.

14th, night, freight on New York Central & Hudson River was derailed near Holley, N. Y.

14th, night, several cars of coal train on New York, Lake Erie & Western were derailed near Lackawaxen, Pa.

21st, a. m., 11 cars of coal train on Columbus, Hocking Valley & Toledo were derailed near Longstreth, O., and wrecked, injuring a brakeman.

22d, a. m., special passenger train on Western North Carolina was derailed near Asheville, N.C., and damaged, injuring 15 passengers slightly.

29th, a. m., 2 cars of coal train on Junction Railroad jumped the track in Pittsburgh, Pa., on a high trestle and, after running a short distance on the ties upset, and fell 60 ft. to the ground below.

30th, p. m., 7 cars of freight on Chicago, Milwaukee & St. Paul were derailed near Anamosa, Ia., and wrecked.

31st, evening, repair train on Houston & Texas Central was derailed near Morgan, Tex. A trainman was badly hurt.

OTHER ACCIDENTS.

BOILER EXPLOSION.

21st, night, locomotive of freight on Chicago & Alton exploded its boiler while standing at Godfrey, Ill., making the engine a complete wreck and killing the engineer.

MALICIOUSLY CAUSED.

31st, night, passenger train on Denver & Rio Grande struck a dynamite cartridge which had been placed on the rails near Leadville, Col. The engine and tender were badly damaged, but the train did not leave the track. The dynamite is supposed to have been placed by strikers.

MISCELLANEOUS.

24th, night, near Greycourt, N. Y., passenger train on New York, Lake Erie and Western was passing an east-bound freight when the door of a box-car swung loose and came in contact with the side of a Pullman sleeper, smashing 18 windows. A passenger was cut by broken glass.

25th, a. m., engine of passenger train on Atchison, Topeka & Santa Fe broke a parallel rod when near Topeka, Kan. The loose end tore a hole in the boiler and the engineer and fireman were badly scalded.

20th, a. m., engine of freight on Mobile & Ohio broke a truck axle when near Meridian, Miss., but did not leave the track.

SUMMARY.

This is a total of 76 accidents, in which 28 persons were killed and 75 hurt; a decrease, as compared with July, 1884, of 13 accidents, an increase of 3 killed and a decrease of 67 injured. A statement of totals and averages will be found on another page.

The seven months of the current year, to the end of July, show a total of 741 accidents, 159 killed and 875 hurt; an average per month of 106 accidents, 23 killed and 125 injured.

Contributions.

English Railroad Trains.

LONDON, Aug. 14, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE :

In your issue of July 24 I notice a quotation from *Harper's Magazine* on the above subject. The quotation as it stands gives anything but a favorable account of these institutions. The writer, however, merely gives the paragraphs you quote as "first impressions," and goes on to say in a passage you have not quoted :

"So much for appearances. The practical man finds a wonderful strength and economy in the build of the beautiful English engine. * * * Its stability is beyond question, and in point of steadiness * * * it has immense advantages. There is not a bit of waste material about it. * * * A critical scrutiny of the carriages shows that they are built with great care. The material is excellent, * * * the gearing altogether more simple, and very strong in proportion to the weight to be carried. * * * All reveal the intention of securing a high degree of efficiency, the greatest degree of safety combined with the highest rate of speed."

The statement, "an English locomotive stands in the same relation to an American as a lawn-mower to a steam fire engine," is a little too absurd to be made seriously, and, with the exception of the New York, New Haven & Hartford, I know of no good American road on which the steam fire engine style of locomotive still calls for misapplied energy on the part of the wiper. English locomotives are perhaps specially distinguished for simplicity and neatness of design, excellence of workmanship, especially in the boiler work, large bearing surfaces, and last, not least, the ample strength of every part. As regards performance, English trains are undoubtedly run faster for a smaller consumption of fuel than those of any other country, and English locomotives are also probably less liable to break-downs. Their "beauty" is a matter of taste, but many admire their graceful curves and simple and substantial appearance.

The article in *Harper's*, though on the whole fairly correct, contains several singular errors. The illustration of the railway station shows a single passenger platform on a single line of railway. This is very unusual, even on small single-track branch lines : two tracks and two platforms are usually provided at every station, so that passenger trains can cross anywhere without inconvenience. The third-class carriage is shown without cushions and tenanted by extremely poor people. Such a carriage is rarely met with, comfortably upholstered cushions and backs being universal on main-line trains, and very general on local services. About 86 per cent. of the total number of passengers (comprising doctors, clergymen, lawyers, merchants and many others who are at least comfortably off) travel third-class. With insignificant exceptions, every train conveys passengers at 2 cents per mile or less ; and railways must, by law, and do, provide smoking accommodation for each class on every train. The following statements in *Harper's* are, therefore, wholly incorrect : "We carry our passengers, high and low, far more cheaply than they do in England." * * * "The third class is bad upon all lines." * * * "On *some* lines carriages are set apart for smokers."

These rash assertions might have been true twenty years ago, when I first became A RAILWAY MAN.

Tests of Steel Rails.

READING, Pa., July 25, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE :

You may be interested in examining the inclosed specifications and blanks used in our method of rail inspection. We read with some concern the letter in last issue from Mr. Hawks, of the Michigan Central Railroad, and your remarks concerning same. We may have something to say on the subject shortly, and meantime it would be more than interesting to your readers to know the particular carbon contents of the specimen from which the illustration was taken, as well as the proportions of the other chemical hardeners, phosphorus, silicon and manganese.

It is our aim in the matter of rail steels, when the three constituents named—phosphorus, silicon and manganese—do not run high, to have all carbons run between 0.40 to 0.50 per cent., and frequent drop and shearing tests serve to check in a measure the analyses. Where soft heats are encountered (the chemical analyses showing the desired hardness), the heats are held and sample pieces subjected to testing-machine investigation.

The prime trouble seems to lie in the fact that many rail-

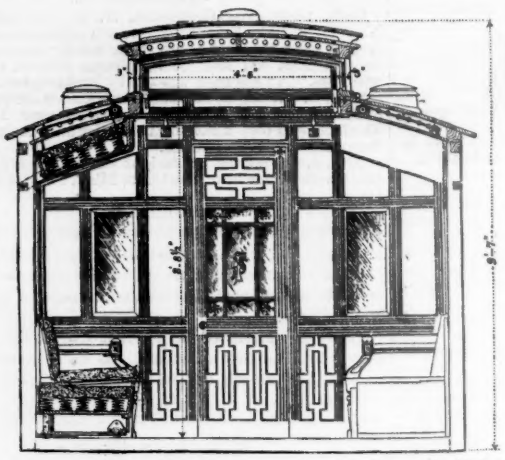


Fig. 1.—Transverse Section Through Main Saloon.

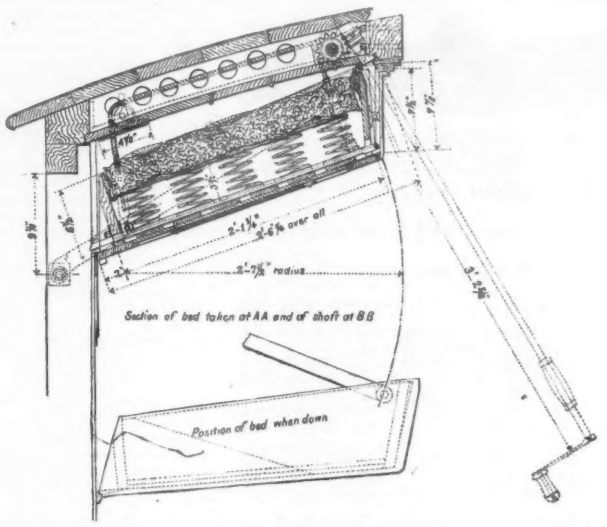


Fig. 2.—Upper Berth Details.

ENGLISH SLEEPING CARRIAGE, BUENOS AYRES GREAT SOUTHERN RAILWAY.

road people are slow to see that the expense of inspection should be borne by the purchaser, or, where inspections are considered desirable, too often inexperienced persons are sent to assume the very arduous duties incident to thoroughly honest inspection, who often look upon the position as a pleasure excursion, and in due course their inspection (*!*) is condemned by experience.

We have succeeded in interesting several influential companies in our methods of inspection, and, we think, satisfied them with references of our past service, and should we close with them on rail contracts now pending we propose to let you hear, from time to time, of the results of our investigations.

THE RAILWAY SUPPLY INSPECTION BUREAU.

[The blanks enclosed are for (1) carbon determination (to be furnished by the maker), (2) ball or drop test, (3) certificate of inspection, with six columns for details of exterior defects and only one, of a very general character ("bad rails"), for physical and chemical defects, and (4) a "specification," also of a very general character, with only one chemical stipulation (carbon 0.30 to 0.50 per cent.) and no stipulation whatever for endurance under physical tests, except that "test-bars" for "any mechanical *check* tests *deemed necessary*" (italics ours) shall be furnished.

The inspection contemplated and made may be, and we trust is, a great deal better than the face of these documents seems to imply; but if so they are unfortunately prepared, for it is precisely the kind of "inspection" which the documents seem to imply—worrying manufacturers' life out with super-sensitive criticism of comparatively trifling exterior defects, "too long," "too short," "crooked," "twisted," "bad drilling," "bad ends," etc., which the naked eye of the commonest track hand can detect as well as any "inspecting engineer"; but laying no stress at all (often for a very good reason) on the physical qualities which the inside of the rail should and must have—which tends to bring about just what has happened, rails good on the outside and bad on the inside. However, no doubt such inspections, like the quality of the rails themselves, is as good as the market demands and as the buyers will pay for.—EDITOR RAILROAD GAZETTE.]

English "Freighters'" Wagons.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In England many thousands of railway wagons belong to private owners, such as the various colliery and iron works proprietors, coal merchants, shippers, etc., and these are known as "freighters' wagons," and form a distinct class from the railway companies' own wagons, being generally of cheap design without spring buffers, but made specially strong to resist the rough usage to which they are subjected. To preserve a certain amount of uniformity in their construction and to provide for safety in working, the various railway companies issue rules and conditions, upon complying with which the company over whose line they will run fix a register plate bearing the maximum load they are to carry, without which certificate, as it were, the wagon would not be allowed to work. This plate also passes the wagons over other companies' lines, and *vice versa;* those having other companies' register plates on are allowed to run over the one in question.

A comparison of the requirements of some of the principal railways shows that although in these various specifications such general dimensions as height and width of buffers, length and size of draw-bar hooks and chains, etc., are sufficiently near as to practically allow rolling stock to be exchanged over all the railways of the country (with the exception of the Great Western broad or 7-ft. gauge), there is still such a want of uniformity in the details, as the sizes of axles, etc., that some central society like the Car-Builders' Association, which would adopt standard axles, axle-boxes and other parts, would be very useful, especially to manufacturers who at present have to build their wagons to suit the crotchets and diverse ideas of the various railway companies or their engineers, some of whom are anything but reasonable in their demands.

It may be mentioned that although nominally the parties bringing the wagons and trading upon the railroad are the owners (and it is they whom the company hold responsible for all defects, etc.), it is difficult at times to say who is the real owner. The freighter, instead of purchasing the wagons direct from the builder, often hires them from him, paying a certain sum per annum, which generally includes the cost of maintenance and repair, or he may purchase them by deferred payments made quarterly for five or seven years, after which time they become his property. If the manufacturer too should prefer cash to these periodical installments, it is customary for him to "finance" them, as it is termed, to a company formed for that and similar purposes, receiving so much money down and giving the necessary authority to collect the rents. Large numbers of wagons also are owned by companies, who make a trade of buying and letting them. As stated above, the railway companies look to the freighter to keep the wagons in good working condition and to grease them after each journey, but during the journey their own inspectors and greasers attend to them. He is also held liable for any damage accidentally caused by defects in the construction or material of the wagon. The station masters on the line are authorized to detain any wagon which appears unfit to run, until the inspector has examined it. Defects are reported to the owner of the wagon, which is then labeled with a ticket marked "not to go," after which it is an offense against the law to remove it without authority. The freighter notifies the party holding the contract for repairs as to the disablement. If near, this party sends men to repair it, but if, as is often the case, it is a long journey, he sends instructions to some firm who makes a specialty of the work, and who keep repairing establishments at all the principal junctions and stations in the country, from the nearest of which the necessary material and men are sent. To save delay, the wagons are usually marked where to be sent, or to whom reported for repairs, and general instructions to repair them are given by the contractor to the repairing agents, who are also supplied with and keep in stock such articles as are most likely to be broken, such as journal boxes, brass bearings, bearing and draw springs, draw chains, etc., of the correct pattern.

Some railway companies, as the Midland, have latterly set their faces against the whole system of freighters' wagons, and that company has spent large sums of money in purchasing them from their owners, their principal reasons being to save the expense of running them back empty, as is the general custom, whereas they can now be utilized by taking loads from the place where they are unloaded and sent to any part of the country. The nearest empty wagons are sent to supply the colliery company or other party to whom they formerly belonged. It does not, however, appear that their example is being followed by other railroads at present.

C. C. EDWARDS.

The Late Peter H. Watson.

SHARPSVILLE, MERCER CO., PA., Aug. 4, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The fact is remarkable that very few people, outside a limited circle, knew much, if anything, of the late Mr. Watson's personal history, or of his connection with events of public importance taking place, from time to time, in the periods, first, from 1836 to 1838; second, 1846 to 1861; third, 1861 to 1864; fourth, 1864 to 1874. He was always a "power." He originated and carried through, to the end aimed at, many enterprises and plans in connection with which the public never heard his name mentioned, notwithstanding the fact that he was the prime (and almost sole) life of them. In his capacity as a patent lawyer he had charge of enormous interests. In his practice in that line he was, with very few, if any, exceptions, entirely successful. In the War Department his services were of inestimable value to the country. He was the terror and scourge of fraud, and the mainspring of much wholesome cleaning out of nests of thieves, and of much very necessary regulation of loosely administered affairs. To Mr. Stanton, Mr. Whiting, and Mr. Watson, three "patent lawyers" (of whom one can hardly say which was, everything considered, the ablest man), the country owes more than to any other three men engaged in behalf of the Union during the Rebellion. They pulled together, and "with a long pull and a strong pull," in the War Department; one as Secretary of War, one as Solicitor of the War Department, and one as Assistant Secretary of War. Each knew the others to be single-minded men, working for the salvation of the republic, regardless of personal considerations, pecuniary or other; and each knew the others to be of eminent ability as well as of the purest motives and lives.

His health seriously impaired by his habit of incessant work, Mr. Watson left the War Department in 1864, but continued to advise in the affairs of the Department until long after Mr. Lincoln's death. On leaving Washington he engaged in business selected on account of the opportunity afforded thereby for out-of-door work. He (with several Cleveland gentlemen) bought large tracts of coal land in Mercer County, Pa., and personally superintended the opening of mines thereon and the building of the railroads necessary to the bringing of their coals to market. These mines have been in successful operation ever since 1865. He was forced by ill health to forego all active employment during the period from early in 1866 to about 1869. Thereafter he carried through for the Lake Shore & Michigan Southern Railway Company the extension of the Jamestown & Franklin Railroad, from Franklin to Oil City—an undertaking in which the "Pennsylvania" interest opposed him by every means at their command. They never made a point against him, and finally he made his own terms for the connection of the (extended) Jamestown & Franklin with the Oil Creek & Allegheny River lines at Oil City. He managed the building of the Ashtabula Branch road, from Ashtabula Harbor to Jamestown, Pa., and had charge of all matters concerning acquisition of lands for the Northern (or Sandusky) Division of the road from Cleveland to Toledo, for the Lake Shore & Michigan Southern Company. He managed the location and construction of the Mahoning Coal Railroad from Youngstown to Andover, and projected the line that was finally built under the name of the Pittsburg & Lake Erie Railroad.

He was induced to accept the presidency of the Erie road by promises that, even if made in good faith, were never kept, and by representations that were essentially illusory.

He expected to find certain of the affairs of the road in extreme disorder, but had no premonition of the fact that all the affairs of the corporation, of that class with which the president of a railroad company as financier and director-general has immediately to do, were in that condition.

He found at the outset an imperative necessity for an investigation of accounts, covering transactions extending through several years, that demanded close and long-continued attention. Pending that investigation, action on most other matters, not immediately connected with the current operation of the line, was necessarily suspended. Hence murmurs, not largely heeded.

The result of that investigation was an amended adjustment of balances that made the company several millions of dollars better off than it was at the commencement of the examination.

A statement has been made that Erie stockholders were dissatisfied with Mr. Watson's modes. Probably those most thoroughly dissatisfied with those modes were other than mere "stockholders." Were there any occasion for a justification of Mr. Watson's course as President of Erie, the facts necessary to such vindication would not be wanting.

After leaving Erie he did some business for Cooper, Hewitt & Co., as a favor to that concern, the members of which were personal friends of his. Later he engaged in perfecting certain inventions in which he saw exceptional merit, and in devising and bringing to absolute mechanical perfection a machine necessary to the working of those inventions. On this work he was largely occupied from about 1877 up to the time of his last visit to his home, or to about June, 1884. During the summer and autumn of 1884 he was engaged in putting his affairs in order, closing up accounts with the Lake Shore & Michigan Southern Railway Company, etc. He went to New York in November, 1884, and after that date did but little, except to advise in the arrangement of the business of the

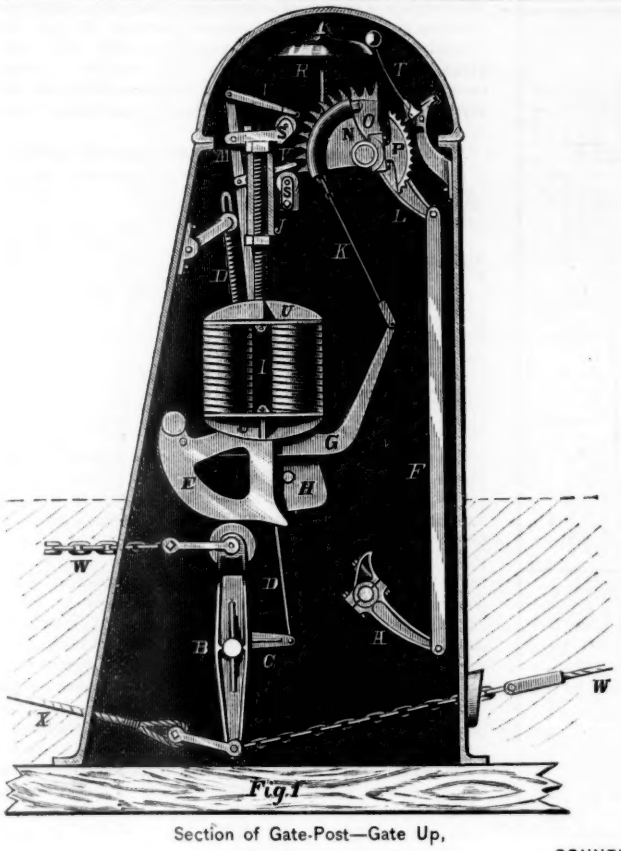


Fig. 1

Section of Gate-Post—Gate Up,

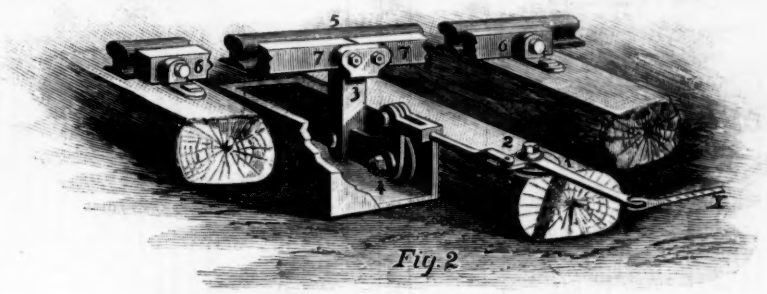
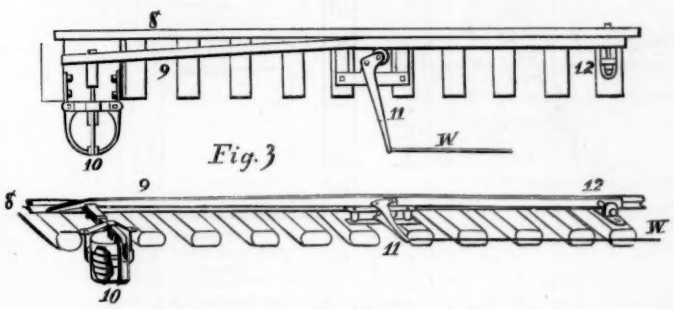


Fig. 2

Gate-Opening or Home Track-Lever and Connections.



Gate-Shutting or Distant Track-Lever and Connections.

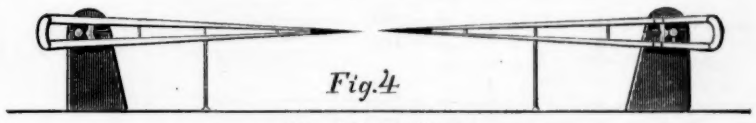


Fig. 4

Pair of Gates Closed.

CONNELL'S AUTOMATIC CROSSING GATES.

concern interested in the inventions alluded to above. I was with him from 1862 to 1866, and from 1870 to 1873, living as a member of his family for about a year of the latter period. He had wonderful natural abilities, and his attainments were simply *vast*. He was a mechanic, a chemist, a jurist, an agriculturist, a geologist, a metallurgist. He could, and *did*, teach the teachers. He *earned* enormous sums of money. In 1864 his income from permanent investments was over $45,000 per year. He earned his money, and earned more for other people than he accepted for his own use.

He has for "amusement," mainly, but partly for experimental practice, carried out, single-handed, undertakings, the accomplishment of the like of which ordinarily occupies a whole community of skilled workers. On one of these occasions of relaxation from study he built a cupola furnace (with all necessary appliances for blowing it by horse-power), built and burned a kiln of charcoal, made his patterns for the casting to be produced, made his flasks and molds, charged and operated his furnace and cast his piece of iron, for the production of which he had prepared as aforesaid, and finished and fitted his casting, which was a crank for an 8-in. shaft, all with his own unassisted hands; and you may be sure that every part of the work was done with consummate skill. His handling of tools was artistic. Whatever he did was done as well as he knew how to do it, and there are few things that he did not know how to do well. He loved to carry operations to the verge of the possible. On the occasion of my first visit to Ashtabula, I determined that I would not inquire as to where and which was Mr. Watson's house. The town was not large. I thought that I could single out the house without assistance other than that of my powers of observation. Not that I expected to see a house agreeing in form or aspect with any description of his "idea" of a house theretofore given me by Mr. Watson, for I knew that he had bought the house that he occupied at Ashtabula, and had not made any material change in the front of it. But I felt that I should, from my knowledge of the man, be able to recognize his habitation. Presently I came to a plainly built brick dwelling that had (evidently recently) been largely extended by an "annex" in the rear of it, the annex without any attempt at ornamention. Everything about the grounds evidenced scrupulous care and attention to details; and in the lawn in front was a plant of the *ricinus communis* (castor bean) of remarkably extraordinary size; a *tree* in comparison with the plant as ordinarily seen. I thought, "Nobody but Mr. Watson could make a castor bean plant grow to that size, out of doors, in this climate," and I confidently concluded that the plant was of Mr. Watson's growing. And so it was. I afterward measured the plant. It was 17 ft. 4 in. from the ground to the highest tip, and the stalk was 4½ in. in diameter at the butt.

Mr. Watson was intimate with but few people. He was reticent. A detailed history of his life and doings would be invaluable; but I do not think that he left anything in the shape of a personal record. Possibly we may have after a while a reasonably satisfactory biographical sketch of Mr. Watson, but I do not know that his family will favor the publication of any such work. JOHN M. GOODWIN.

Experience with Light Rails.

BUENOS AYRES PACIFIC RAILROAD.
KILO. 255, June 29, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In connection with a note in your issue of April 3 from "Track," relative to the weakness of light rails and the spacing of cross-ties, I should like to say that we are using a 50 lb. English steel rail with Livesey's patent iron sleepers, which give 21 in. of support to 28 in. of suspension, or, in other words, the supports are 21 in. long and the clear distance between supports 28 in.; all loam ballast. Over this track we are using engines of about 40 tons on a wheel base of about 18 to 20 ft., as an average of the different styles. The east end of the road has been in use for about 20 months, and shows good track and the rails in good condition.

One point seems to have been overlooked in "Track's" note; the greater liability to spring or bend light rails in handling, previous to laying—an item that we deem of much importance, inasmuch as our material must be handled several times between the mill and the "front."

F. L. GRISWOLD.

Cornell's Automatic Crossing Gate.

The device illustrated is one of the many attempts which have been made from time to time to secure the advantages of a gate-protection at highway crossings, without the expense of an animated gate-keeper; but it is quite different in its details from most of them. The train itself, on passing a certain point, works a trap which permits a compressed spring to force the gates down slowly (and also ring an alarm) against the counter-weights which tend to keep them up. On reaching the crossing, the weight of the train re-compresses the spring, relieving the gates from their action and permitting the counter-weights to bring them back again to the vertical.

In fig. 1, *W W* are the closing cables, either the one or the other being operated according to the direction from which the train is approaching. This cable is pulled 6 in. by the operation of the mechanism shown in fig. 3, thereby moving the roller at the upper end of the lever *B* entirely from under the spring-cam *E*. This allows the springs *I* (which have been left compressed after the last opening of the gates by the mechanism of fig. 2) to exert their power on the lever *G*, which pulls on the rod and chain *K*, attached to the shieve segment *N* on the gate pivot, thus turning the pivot point of the gates and forcing them to close.

The time of closing is controlled by a seconds pendulum, of which *H* is the ball, *M* the stem or rod, and *V V* the escapement pallets. *O* is a segment of an escapement wheel on the gate pivot.

When the gates are open the pendulum is held about 3 in. out of a perpendicular by the little roller lever just above the upper letter *D*. As the cable *W* pulls the roller or lever *B* from under *E*, it also forces the lever *C* up, and this, through *D*, removes the small lever from behind the pendulum-roll *M*, and allows the pendulum to begin its vibrations at the same time that the spring power is acting to close the gates.

All the time the gates are closing a 12-in. gong *R* is being struck by the hammer *T* through the gong-ratchet *P*.

To open the gates the cable *X*, figs. 1 and 2, is pulled 6 in. by the action of the home track-lever, fig. 2, thereby compressing the springs *I* again, relieving the lever *G* from pressure and so allowing the counterweighted gates to return of themselves to a vertical position.

The arms *A* and *L* and the connecting rod *F* communicate the power, through a shaft to which the arm *A* is attached, to the opposite gates. The cut represents the machinery for a single-armed gate. When double gates are used a shieve-pulley is placed on the pivot at *A*, over which a connecting cable passes to the other gate.

The gate-shutting track-lever, fig. 3, is placed far enough away from the crossing so that at the highest speed of trains it requires a few seconds more for the train to reach the crossing than is occupied by the gates in closing. In closing the gates the train approaches the track lever, shown in the engraving, from the left.

It will be seen from fig. 3 that the track-lever is so arranged that a train running *toward* the crossing (from 8 toward 12 in the engraving) will press the track-lever horizontally outward, by the outside of the wheel pressing against the lever at about the point 9, where it is some 2 in. above the top of the main rail 8, and so cause it to slide outward on the pivot-bolt 12, actuating the lever 11 and so moving the connecting-rod *W* about 6 in. On the other hand, a train running *away* from the crossing, and hence having done with all need for acting on the crossing mechanism, simply rides up on it and presses it downward to the level of the main rail, having no other effect than to compress the spring 10, by which it is (very gradually) restored to its original level, ready to be acted upon by a train from the right direction.

The home lever, or gate-opening lever, 7, fig. 2, normally lies flush with the top of the rail, as shown. When either distant lever has shut the gate, fig. 1, by means of the connection *W*, it must at the same time pull on the home-lever connection *X*, figs. 1 and 2, and so raise the bar 7, 7 above the surface of the rail. As the train reaches the crossing and presses down on this bar, it will be readily seen that it must press the lever down again, restoring the lever *B* and connected parts to the position shown in fig. 1, compressing the springs *I* and relieving the lever *G* from pressure, thus permitting the gates to open, as they do by their own weight.

All the real work of operating the gates, consequently, is done by the home lever. The distant levers do no more than to pull the roller from under the cam *E*, and raise the home lever, and consequently, very little power need be transmitted.

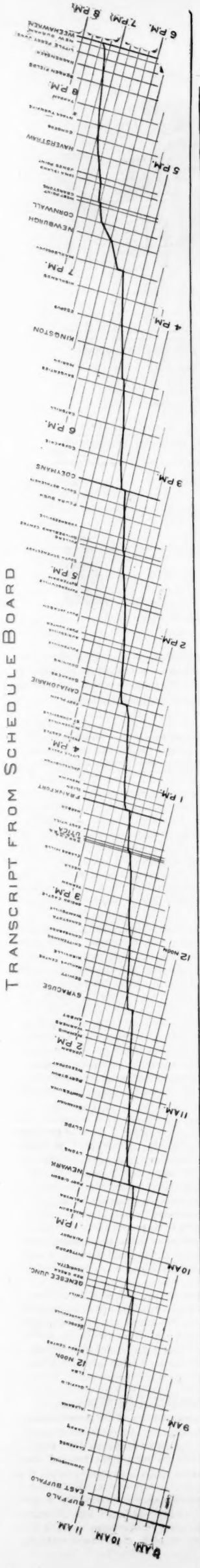
The cable for transmitting the power is made of alternate strips of wood and iron, about 75 per cent. of its length being wood and 25 per cent. iron. The effect of this, the inventor claims, is that, if the cable is boxed so as to be shielded from the direct action of the sun, the one material contracts when the other expands; thereby securing, it is claimed, a practically stationary length of cable. The inventor says that he has proved this practically, having had a cable 1,200 ft. long in use since Oct. 7 last throughout the fall and winter months to the present time, and found no sensible variation of length. A variation of an inch or two, however would not be important.

The inventor of this device is Mr. Oliver H. P. Cornell but it is controlled by the Automatic Railway Gate and Signal Company of New York, of which Mr. Walter Katté Chief Engineer of the New York, West Shore & Buffalo Railway, is President. It has been practically tested, up to the present time, chiefly on the Staten Island Railroad where it said to have made an excellent showing.

English Sleeping Carriage.

The design illustrated, prepared by Mr. James Livesay, Consulting Engineer of the Buenos Ayres Great Southern Railway, for sleeping cars for use on that line, differs markedly, it will be noticed, from the style most favored here. While very doubtful if the variation is an improvement, it is at least a matter of interest.

The carriage, like an American car, is entered by a platform (a rather narrow one) at each end, and like American sleeping and other cars has toilet conveniences at each end. Its interior details in other respects differ quite radically.



SPEED BETWEEN STATIONS, IN NEAREST EVEN MILES PER HOUR

DEDUCTING ACTUAL STOPS PLUS 2 MINS. PER STOP FOR LOSING AND GAINING HEADWAY

BUFFALO DIVISION

WEST END	EAST END	NEWARK	LYONS	CLYDE	SAVANNAH	MONTEZUMA	PORT BYRON	WEEDSPORT	JORDAN	MEMPHIS	AMBOY	SYRACUSE	MANLIUS CENTRE	KIRKVILLE	CHITTENANGO	CANASTOTA	ONEIDA CASTLE	VERNON	CLARKS MILLS	UTICA	HARBOR	FRANKFORT
EAST BUFFALO	—	64	61	59	62	59	57	61	59	62	59	57	61	59	62	59	57	61	59	62	59	57
BOWMANSVILLE	—	—	59	57	61	58	56	60	58	61	58	56	60	58	61	58	56	60	58	61	58	56
CLARENCE	—	—	—	63	58	60	58	62	60	63	60	58	62	60	63	60	58	62	60	63	60	58
ARRON	—	—	—	—	64	61	59	63	61	64	61	59	63	61	64	61	59	63	61	64	61	59
ALABAMA	—	—	—	—	—	74	70	74	70	74	70	68	72	70	74	70	68	72	70	74	70	68
OAKFIELD	—	—	—	—	—	—	65	71	70	74	70	68	72	70	74	70	68	72	70	74	70	68
ELBA	—	—	—	—	—	—	—	78	78	78	77	76	78	78	78	78	76	78	78	78	78	76
BYRON CENTRE	—	—	—	—	—	—	—	—	70	70	70	68	70	70	70	70	68	70	70	70	70	68
BERGEN	—	—	—	—	—	—	—	—	—	68	72	69	72	72	72	72	69	72	72	72	72	69
CHURCHVILLE	—	—	—	—	—	—	—	—	—	—	78	68	72	72	72	72	69	72	72	72	72	69
CHILI	—	—	—	—	—	—	—	—	—	—	—	67	74	74	74	74	71	74	74	74	74	71
GENESEE JUNC.	—	—	—	—	—	—	—	—	—	—	—	—	67	64	68	64	61	64	64	64	64	61
RED CREEK	—	—	—	—	—	—	—	—	—	—	—	—	—	64	61	64	61	64	64	64	64	61
PITTSFORD	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60	59	56	61	61	64	64	61
FAIRPORT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	62	66	66	70	70	66
MACEDON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57	74	74	78	—	—
PALMYRA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PORT GIBSON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NEWARK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

BUFFALO DIVISION

WEST END	EAST END	NEWARK	LYONS	CLYDE	SAVANNAH	MONTEZUMA	PORT BYRON	WEEDSPORT	JORDAN	MEMPHIS	AMBOY	SYRACUSE	MANLIUS CENTRE	KIRKVILLE	CHITTENANGO	CANASTOTA	ONEIDA CASTLE	VERNON	CLARKS MILLS	UTICA	HARBOR	FRANKFORT
FRANKFORT	—	39	44	47	51	49	52	55	53	55	58	61	59	56	59	56	54	51	54	56	59	59
ILION	—	—	64	60	58	62	59	58	60	63	61	64	62	59	62	59	57	60	57	59	62	59
MOHAWK	—	—	—	63	56	62	59	60	60	62	59	57	61	59	62	59	57	61	59	62	59	57
JACKSONBURGH	—	—	—	—	76	75	66	66	65	65	64	61	64	61	64	61	59	63	61	64	61	59
LITTLE FALLS	—	—	—	—	—	74	62	61	61	53	54	56	57	57	60	60	60	63	61	64	61	59
INDIAN CASTLE	—	—	—	—	—	—	50	52	57	46	48	51	53	54	55	57	55	59	57	60	57	55
MINDENVILLE	—	—	—	—	—	—	—	57	61	49	49	51	54	54	54	54	54	57	54	57	54	54
ST. JOHNSVILLE	—	—	—	—	—	—	—	—	60	49	49	50	54	54	55	55	55	57	54	57	54	54
FORT PLAIN	—	—	—	—	—	—	—	—	—	30	40	44	51	52	55	55	55	56	55	56	55	55
CANAJOHARIE	—	—	—	—	—	—	—	—	—	—	60	62	56	57	56	56	56	59	56	59	56	56
SPRAKERS	—	—	—	—	—	—	—	—	—	—	—	60	65	66	66	66	66	69	66	69	66	66
DOWNING	—	—	—	—	—	—	—	—	—	—	—	—	71	72	66	66	66	69	66	69	66	66
FULTONVILLE	—	—	—	—	—	—	—	—	—	—	—	—	—	74	66	66	67	67	67	69	67	67
AURIESVILLE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64	57	64	64	64	64	64	64
FORT HUNTER	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64	57	64	64	64	64	64
PORT JACKSON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	58	64	64	67	64	64
PATTERSONVILLE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51	51	51	51
ROTTERDAM JC.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	56	62	56	56
SOUTH SCHENECTADY	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51	51
FULLERS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51
GUILDERLAND CTR.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51
VROOMSBURGH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FEURA BUSH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SOUTH BETHLEHEM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
COEYMANS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

HUDSON RIVER DIVISION

WEST END	EAST END	COEYMANS	CORSACKIE	CATSKILL	SAUGERTIES	KINGSTON	ESOPUS	HIGHLAND	MARLBOROUGH	NEWBURGH	CORNWALL	WEST POINT	IONA ISLAND	JONES POINT	HAVERSTRAW	CONGERS	NYACK TUNNEL	TAPPAN	BERGENFIELDS	HACKENSACK	LITTLE FERRY JC.	NEW DURHAM	WEEHAWKEN
COEYMANS	—	—	76	64	60	64	57	61	59	62	59	57	61	59	62	59	57	61	59	62	59	57	61
CORSACKIE	—	—	—	63	58	60	58	62	60	63	60	58	62	60	63	60	58	62	60	63	60	58	62
CATSKILL	—	—	—	—	50	54	53	53	54	56	54	53	57	54	57	54	53	57	54	57	54	53	57
SAUGERTIES	—	—	—	—	—	50	56	54	56	58	56	54	58	56	58	56	54	58	56	58	56	54	58
KINGSTON	—	—	—	—	—	—	47	51	53	52	53	51	55	53	55	53	51	55	53	55	53	51	55
ESOPUS	—	—	—	—	—	—	—	54	55	54	55	53	57	55	57	55	53	57	55	57	55	53	57
HIGHLAND	—	—	—	—	—	—	—	—	57	56	57	55	59	57	59	57	55	59	57	59	57	55	59
MARLBOROUGH	—	—	—	—	—	—	—	—	—	27	32	34	38	39	42	43	44	47	48	49	48	49	49
NEWBURGH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CORNWALL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WEST POINT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IONA ISLAND	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JONES POINT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HAVERSTRAW	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CONGERS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NYACK TUNNEL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TAPPAN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BERGENFIELDS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HACKENSACK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LITTLE FERRY JC.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NEW DURHAM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WEEHAWKEN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

HUDSON RIVER DIVISION

WEST END	EAST END	NEWARK	LYONS	CLYDE	SAVANNAH	MONTEZUMA	PORT BYRON	WEEDSPORT	JORDAN	MEMPHIS	AMBOY	SYRACUSE	MANLIUS CENTRE	KIRKVILLE	CHITTENANGO	CANASTOTA	ONEIDA CASTLE	VERNON	CLARKS MILLS	UTICA	HARBOR	FRANKFORT
COEYMANS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CORSACKIE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CATSKILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SAUGERTIES	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
KINGSTON	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ESOPUS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HIGHLAND	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MARLBOROUGH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NEWBURGH	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CORNWALL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WEST POINT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IONA ISLAND	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
JONES POINT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HAVERSTRAW	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CONGERS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NYACK TUNNEL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TAPPAN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BERGENFIELDS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
HACKENSACK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
LITTLE FERRY JC.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
NEW DURHAM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WEEHAWKEN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

The carriage is very small, consisting of only six sections and a stateroom. Four of these sections constitute at night the "main compartment," communicating with the toilet arrangements at one end of the car. The next two sections constitute a smaller compartment communicating with the vestibule at the other end, as does also the stateroom, which is opposite the toilet closet.

The following are the principal dimensions of the carriage:

	Ft.	In.
Length of underframe over platforms	34	1
Width over sole bars* (side-sills)	7	7
Length over buffers	37	5
" " footboard	10	8
" of body	29	0
Width "	10	0
Height " outside, at sides	7	3
" " inside, including space occupied by upper berth, at sides	6	7
Height of body, inside, at centre	8	8½
Total height above rails	13	5
" wheel-base	18	10
Distance between centres of journals	7	4
Diameter of journals	0	3⅝
Length	0	8
Diameter of axles at centre	0	4¾
" of wheels	3	6
Length bearing-springs	7	0

The upper berth mechanism is shown with sufficient clearness in the engravings. When it is required to lower the bed for use, the attendant first pushes back a locking bar and then places a handle, shown in dotted lines in fig. 2, into position for actuating the worm and wheel gearing, which is carried on a shaft of the same length as the berth. In this way the ropes which hold the bed in position are unwound from the grooved barrels on which they are coiled, and the bed is thus allowed to fall into position, as shown. An iron arm, shown in dotted lines in fig. 2, is attached to the back of the carriage by a stud at one end, the other being fastened by a stud to the front part of the berth. This arm pivots as the bed comes down, and forms a radius bar which causes the bed in descending to describe the segment of a circle shown by the direction line in fig. 2, thus guiding the bed in its descent and forming a means of suspending the front part when in use. The back part rests on small brass lugs on the back of the carriage.

The outside of the berth, it will be seen, must be dropped further than the inside, which is regulated by the size of the worms. The bed does not depend on the ropes for support when in use, the latter only serving for raising and lowering. The side sofas which form the lower berth do not pull down flat so as to make, with the back, a double berth, as with us, but only pull out a few inches so as to give a little more room for turning over.

It will be observed that the upper berth when in place is given a very considerable cant inward, apparently for the purpose of preventing the occupant rolling out, which may be necessary, but we should judge would be very uncomfortable.

Our English friends, however, sometimes have ideas which are all their own as to what is comfortable and uncomfortable, like other people, and perhaps this is one of them. Another, which we are told has been embodied in their carriages, is "a pad to form a rest for the knee," whatever that may be, to avoid what we are told is "a not uncommon thing," that passengers should "take a portmanteau into bed with them in order to get a due amount of support for sleeping on the side;" for *Engineering* (to which we are indebted for our engravings) adds with pleasing frankness and truth that "few people are able to rest for long on their backs." Precisely what the nature of this pad may be, which relieves people from the need of sleeping on their backs; where it is placed; who the people are who take "a portmanteau into bed with them" in order to be able to sleep on their side, and where and why and how they do it; what there is to prevent a free-born Briton fron lying on his side if he chooses to without the help of his grip-sack, and how the grip-sack helps the matter—these are questions which must remain unanswered in the columns of this journal, for we do not know. If we were to judge by what we know about sleeping cars in this country, we should suspect either that the editor or designer had evolved the difficulty from the depths of his inner consciousness, or that some wicked wag had been trifling with his or their inexperience; for among all the charges brought against sleeping cars we never yet heard it alleged that any one found difficulty in sleeping either on his back or his side, as his fancy dictated. Perhaps it is one of the eccentricities of the genus British Traveler to go to bed with his grip-sack on, and he has not yet learned that it is needless. If so, the limited favor which sleeping cars meet in England is in part accounted for.

The Fastest Run Ever Made.

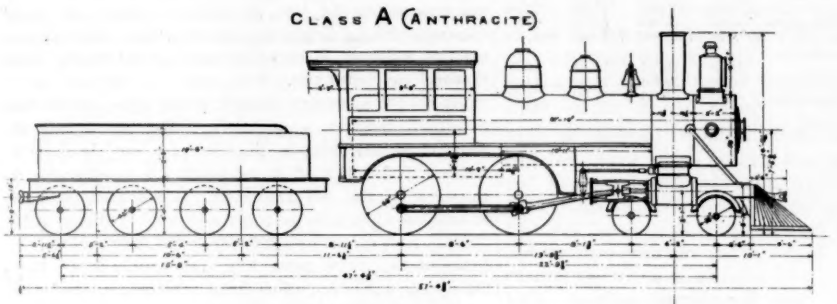
From all the comments in this country and abroad which have so far appeared, it seems to be generally admitted that the fast run over the New York, West Shore & Buffalo Railway, described in full in our issue of July 17, is, upon the whole, the most remarkable performance in the way of long-sustained high speed which has ever been made. As such it appears worthy of permanent record, and Mr. J. D. Layng, General Manager of the line, has caused the record to be preserved, so far as the archives of that line are concerned, in a large blueprint embodying every important detail.

For the same reason we re-engrave for our columns the more important parts of this blue-print, viz.: those showing the locomotives in detail, the speed record from and to every station, and the physical characteristics of the line; the latter being something as to which we could not, in our former notice of the run, give definite information.

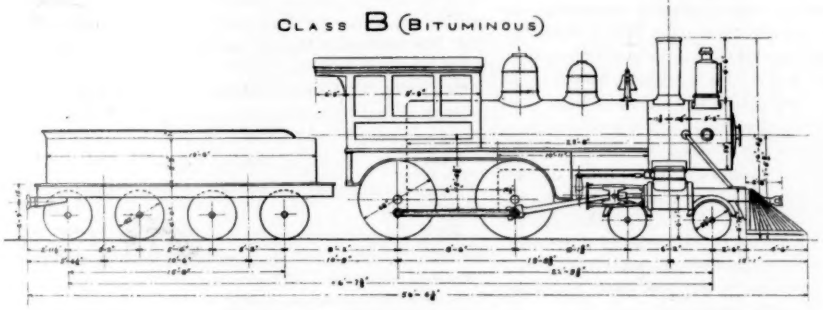
The weight of train also was not given quite correctly in our former issue, having been our own estimates, although we note they have been copied by other journals (without credit)

* The additional width is got by means of wrought-iron brackets bolted on.

CLASS A (ANTHRACITE)



CLASS B (BITUMINOUS)



LOCOMOTIVES: GENERAL DIMENSIONS, WEIGHTS &c

SPECIFICATIONS		CLASS A	CLASS B	SPECIFICATIONS		CLASS A	CLASS B
CYLINDERS	DIA. & STROKE	18"x24"	18"x24"	BOILER	DIA. OF SMALLEST RING	55"	66"
"	PORTS—LENGTH	16"	16"	"	LENGTH OF BARREL	10-11"	10-11"
"	STEAM PORT—WIDTH	1⅝"	1⅝"	FIREBOX	" OUTSIDE	10-9"	6-7"
"	EXHAUST " "	3½"	3½"	"	WIDTH "	48"	41⅝"
VALVES	ALLEN RICHARDSON			"	DEPTH INSIDE FRONT	49½"	74⅛"
"	TRAVEL (MAXIMUM)	5⅛"	5⅛"	"	SIZE OF GRATE	120⅝"+49"	70⅛"+39"
"	OUTSIDE LAP	1"	1"	"	GRATE AREA SQ. FT.	34	17
"	INSIDE "	⅛"	⅛"	TUBES	NUMBER	188	188
"	LEAD IN FULL GEAR	⅛"	⅛"	"	EXT. DIAMETER	2"	2"
EXHAUST NOZZLES	HIGH DOUBLE			"	LENGTH BETWEEN SHTS	10-10⅛"	10-10⅛"
" "	DIAMETER	3⅝"	3⅝"	"	AREA THROUGH SQ. FT.	3.17	3.17
" "	HEIGHT FROM BASE OF STK	18"	18"	HEATING SURFACE	TUBES SQ. FT.	1084	1084
BOILER PRESSURE	PER SQ. IN.	140	140	" "	FIREBOX " "	128	128
SMOKE STACK	HEIGHT ABOVE RAIL	14-5½"	14-5½"	" "	TOTAL " "	1212	1212
" "	DIA. AT TOP	20½"	20½"	WEIGHT OF ENGINE	IN WORKING ORDER,	96000	94500
" "	" " BASE	10"	18"	" " "	ON TRUCK	32000	32000
" "	SMALLEST INTERNAL DIA.	15"	15"	" " "	" DRIVERS	64000	62500
ENG. TRUCK WHEELS	ALLEN PAPER			" "	" TENDER LOADED	76000	76000
TEN. " "	" "			" "	" EMPTY	36400	36400
CAP'Y OF TENDER	COAL POUNDS	15000	15000	MAXIMUM WEIGHT OF ENGINE & TENDER		172000	170500
" " "	WATER GALLONS	3000	3000	AVERAGE " " "	" "	154000	154000

SUMMARIZED SPEED RECORD

WITH DEDUCTIONS AS NOTED

ALL DIVISIONS

PRINCIPAL STATIONS ONLY

	BUFFALO	EAST BUFFALO	GENESEE JUNC.	NEWARK	SYRACUSE	UTICA	FRANKFORT	CANAJOHARIE	ROTTERDAM J.	COEYMANS	KINGSTON	CORNWALL	HAVERSTRAW	WEEHAWKEN
BUFFALO	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EAST BUFFALO		—	68	67	64	62	62	60	60	60	58	58	57	57
GENESEE JUN.			—	65	61	59	60	58	58	59	56	56	55	56
NEWARK				—	59	57	59	57	57	58	55	55	54	55
SYRACUSE					—	56	58	56	57	57	55	54	54	55
UTICA						—	73	55	57	58	54	54	53	54
FRANKFORT							—	51	55	57	53	53	52	54
CANAJOHARIE								—	60	60	54	54	53	54
ROTTERDAM J.									—	61	52	51	51	53
COEYMANS										—	46	50	49	52
KINGSTON											—	54	51	55
CORNWALL												—	46	55
HAVERSTRAW													—	62
WEEHAWKEN														—

PHYSICAL CHARACTERISTICS OF ROAD

ELEMENTS			BUFF. DIV. W. END	BUFF. DIV. E. END	HUD. RIV. DIV. W. END	HUD. RIV. DIV. E. END	ENTIRE LINE
PROFILE							
LEVEL		PERCENTAGES	16.93	27.03	29.94	42.18	30.18
UP GRADE	(GOING EAST)	PERCENTAGES	45.59	37.50	29.59	30.41	35.62
DOWN GRADE	" "	PERCENTAGES	37.48	35.47	40.47	27.41	34.20
UP GRADE	" "	AVERAGE FEET PER MILE	16.25	15.88	16.36	16.96	16.32
DOWN GRADE	" "	AVERAGE FEET PER MILE	18.75	18.49	17.66	22.77	19.51
ALIGNMENT							
TANGENTS		PERCENTAGES	82.52	83.44	73.85	84.26	82.06
CURVES		PERCENTAGES	17.48	16.56	26.15	15.74	17.94
CURVATURE: AVERAGE, DEGREES			1°20-57"	1°46-11"	2°4-46"	1°48-11"	1°46-34"

THE FAST RUN ON THE WEST SHORE.

as exact. The true weights of the train over three of the four engine divisions were as follows:

Engine No. 45, Class B (bituminous)	94,500
Tender, with ⅔ load of coal and water	62,800
Baggage car, West Shore, No 737	46,030
Official " " " " 90	61,200
" " Balto. & Ohio, No. 711	46,430
Total pounds	310 960
Total tons	155 +

On the north end of the Hudson River Division the Class A (anthracite) engine was used, increasing the weight of the train by 1,500 lbs. (engine, 96,000 instead of 94,500 lbs.). The estimated weight given in our former account was 292,500 lbs. for the entire train.

Lubricating Locomotive Valves and Cylinders.

The last meeting of the Western Railway Club was devoted to the discussion of this subject and the seating of cars for suburban traffic; the report of which latter we postpone:

Mr. ANGUS SINCLAIR opened the discussion. Like most of them, he was perfectly familiar with the lubricating of locomotive cylinders. When he first began firing, no oil cups whatever for the locomotive cylinders were in use, but judging from the condition the valves usually got into, that was a very expensive way. Then the steam-chest cups were put on; an improvement in its way, but a very crude way still. You could get oil into the steam chest, but its supply was necessarily fluctuating, and depended too much on the fireman's activity. Putting cups in the engine cab was a further decided improvement, but still a crude way. He had repeatedly, while pulling up a heavy grade, stalled with the train, and after backing up and oiling the valves, gone over; showing that a very great deal of the power had been absorbed in moving the dry valves and pistons. The proper way seemed to have a continuous supply. To supplement proper lubrication, he thought that all valves should be balanced.

Mr. COOKE was interested in the "sight-feed" lubricators, and would like to hear the results of experience.

President STEVENS: Within the last few years the Lake Shore has been putting on, largely, sight-feed cups, and the engines work much better with them. A recent statement showed a saving of from 6 to 10 per cent. in favor of the sight-feed cup. After they are first applied, the cost of maintenance is very little, and he was prepared to recommend them. There are several kinds in the market, all good ones so far as he knew. The saving was both in the case of the engine's working and in the amount of material used. They had some 200 or 250 engines equipped with them.

Mr. COOKE: They had no trouble with their stopping. They could only go wrong by giving out entirely.

Mr. VERBRYCK inquired as to lubricants. On their road he had heard that they used what is called "Perfection valve oil" altogether.

Mr. COOKE had tried a great many valve oils, but had never found anything so effectual as good tallow. They got better results from it than with any oil they had tried. He supposed it would be better still to have the tallow rectified to take out the acids. He had never seen any oils preferable to that.

The PRESIDENT had only heard it objected to tallow that it was corrosive and that there was a waste. You can pay out oil much closer than you can tallow.

Mr. SINCLAIR had had very good success with tallow by neutralizing it with carbonate of soda; but it required some one with a little experience in chemistry. He had never found an oil, not even sperm oil, that did quite so well as tallow did, but some of the mineral oils used certainly come very close to it.

Mr. TOPPAN questioned the possibility of such neutralization. The only way that he had ever discovered—and they had had it tested pretty well by the best chemists there, and it had also been tried in Europe—was to decompose the tallow. When you decompose the oil you have no lubricant. He believed it a well understood fact that acid cannot be removed without destroying the oil. That was the finding of Professor Doremus and several others, he believed. He knew the Boston & Maine road spent several thousand dollars in that undertaking, and they gave it up as a failure.

TECHNICAL.

The Decline in Old Rails.

The *Iron Age* gives the following summary of the range of prices of old rails at four leading markets since Jan., 1884.

1884.	New York.		Philadelphia.		Pittsburgh.		Chicago.	
Jan	21.50	22.50	22.	23.	23	23.50	21.	22.
Feb	21.	22.	22.50	23.	23.50	24.	19.	21 50
March	20.	22.	22.	22.50	23.	24.	19.	20.
April	19.	20.	21.50	22.	22.50	23.	19.50	21.
May	19.	20.	20.	21.50	22.25	22 50	20.	22.
June	18.	19.50	18.50	20.50	22	22.50	19.	20 25
July	17.	18 50	18.	19	20.50	22.	19.	19 50
Aug	18.	19.50	17.50	19.	20	20.75	17.	19.50
Sept	17.	18 50	18.	18 50	19.50	20.	17 50	18.50
Oct	16.50	18.	18.	18 50	19.	20.	17.50	19.
Nov	16.	17.	17 50	18.	18.50	20.	17.50	18.
Dec	16.	17.	17.	17.50	18.50	19.	17.	18.
1885.								
Jan	16 50	17.	17.50	18.	18.50	19.	17.50	18.
Feb	16 50	17.	17.	17.50	18	18.75	17 50	18.
March	16.75	17.50	17.	18.	18.50	19.50	17.25	18.
April	16 50	18.	17.25	18.	19.50	20.50	17.25	18.50
May	16 50	17.	17.25	17 75	19.	19.50	17 25	18.
June	16.50	17.	17 25	17.50	18.50	19.	17.25	17.50

The decline will be seen to have been almost uninterrupted, and to have been about $5 per ton in the 18 months. The following summary of the immense stock of old rails still existing is then given, based on the figures of Poor's *Manual*:

	Total track. Miles.	Steel rail in track. Miles.
1882	140,950	66,691
1883	149,183	78,491
1884	156,497	90,243

"According to these returns, there are roughly 66,000 miles of track in the United States still laid with iron. At 75 tons of iron per mile this represents nearly 5,000,000 tons of old material. During the years 1883 and 1884 the additions to mileage of track were roughly 8,200 and 7,300 miles, respectively, while the mileage of track laid with steel rails increased uniformly 12,000 miles. This would indicate a displacement of iron by steel rails on 3,800 miles in the first year and 4,700 miles in the second. Since this is bound to increase, because the iron rails are rapidly becoming unserviceable, 5,000 miles may be regarded as a fair average in times when the railroads are poor. In prosperous periods we may see the quantity rush up to double that amount. At the rate named the supply of old rails would roughly be 375,000 to 400,000 tons. By far the greatest proportion of this will have to be utilized by re-rolling, unless our open-hearth steel-makers find it possible to adopt the basic process. For the next five or six years old iron will occupy a very important position in the iron trade, and it is difficult to see how they can, generally speaking, help being forced on the market in uncomfortably large quantities."

Railroads in Central Asia.

The Central Asiatic Railway will now be pushed forward very energetically, in pursuance of the recent imperial order. Gen. Annenkoff, charged with the direction of the necessary works, has already started for the Trans-Caspian, and will be there before you receive this letter. Great attention is paid in Russian circles to this railway, which will be of the utmost importance, not only strategically, but also in its relation to commerce. The line will go in a direct southeastern direction to Kakhka, which place is about halfway between Askabad and Sarakhs, but then the road will take a northeastern direction to Merv and further to Bourdalik, on Amu-Daria. In this way the railway, which has hitherto closely followed the Persian frontier, will suddenly branch off at an angle and be continued to a distance of about 50 miles from the new Russo-Afghan boundary, which is thought will be settled by the negotiations between England and Russia. The considerations which have determined the government to choose this direction for the railway are commercial ones, and the line now will be connected with the principal fluvial communications in the Russian possessions in Central Asia, also with the great caravan roads. The expenses of keeping up the railway will be serious. They are calculated at nearly 2,000,000 roubles a year, and during the first year or two the receipts will scarcely amount to 200,000. After that time, when the Central Asiatic merchants have learned to appreciate the new means of communication, the traffic may be expected to largely increase. It is said on good authority that the Central Asiatic Railway will be continued next year across the Bokharian territory to Samarkand, and from thence to Tashkend, the residence of the Turkestan Governor-General. The distance between the two towns is 260 English miles.—*St. Petersburg Letter to the London Daily News.*

British Rail Exports.

For the month of July and the seven months then ending the exports of steel and iron rails from Great Britain to the United States and to all countries are reported as follows by the Board of Trade, in tons of 2,240 lbs.:

To United States:	July. 1883.	July. 1884.	1885.	Seven months. 1883.	Seven months. 1884.	1884.
Steel	5,547	4,135	....	35,403	14,836	4,843
Iron	....	....	....	2,399	...	....
Total	5,547	4,135	...	37,802	14,836	4,843
To all countries:						
Steel	64,071	55 872	49,879	456,024	350,514	302,391
Iron	2,279	2,303	598	18,570	8,804	7,563
Total	66,350	58,178	50,477	474,594	359,318	309,954

Thus there were no exports to this country in July, and for the seven months our imports were but one third as great as last year and not one seventh those of 1883, the total exports to the United States for the seven months having been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
8,948	140,417	184,648	140,047	37,802	14,836	4,843

Thus in 1881 we imported 29 times as many rails as this year.

The decrease in exports to countries other than the United States was but 3,566 tons (6½ per cent.) in July, and 39,371 tons (9 per cent.) for the seven months, compared with last year, but compared with 1883 it was 17 per cent. in July and 30 per cent. for the seven months. India has taken 30 per cent. of the whole this year, and twice as much as any other country, Australia following with 16 per cent. and Canada with 15 per cent. Mexico took but 408 tons, against 2,471 last year and 22,675 in 1883.

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

UNITED STATES RAILROADS IN 1884.

The new Poor's Manual gives opportunity for another study of the position and recent progress of the railroads of the United States as a whole. The summary in the introduction now includes nearly all the railroads in operation in the United States, and for three years it has given the most important statistics of all, namely, statistics of *traffic*, which we first had for the entire country in the census report for 1880. The Manual, it must be remembered, must obtain its figures from the annual reports of the corporations to their stockholders or to state authorities, which are for fiscal years ending probably with every month of the year, and only for the smaller part of the roads being the same as the calendar year, a very large number being for the 12 months ending with September, and not a few for the year ending with June, 1884, and some even at an earlier date, as the great Chicago & Northwestern, to May 31 *of last* year, and the Chicago, Rock Island & Pacific to March 31 (but with a very brief summary of the last report in a supplement). Among the railroads reporting to June 30 are the Louisville & Nashville, the East Tennessee, and the Nashville & Chattanooga, while the year of nearly all the New England and New York companies ends with September. Comparatively few of the reports are for years ending in 1885. Thus the *average year* is not 1884, but a twelvemonth ending somewhat earlier, perhaps in October.

It is important to know this in times like the present, when business has been getting worse and worse. The Erie and the New York Central, for instance, made considerably better returns in the year to Sept. 30 than in the year to Dec. 31 last year.

We purpose below to compare the chief facts of the railroad system of this "year" called 1884, not only with previous years given in the Manual, but also with the census statistics for 1880, which also was a year of different dates for different companies, but the effort was to take the report covering the year nearest to that ending June 1, 1880, and the average was probably not far from that date. The reports of the large number of roads given for the calendar year were thus for 1879, and the large number reporting to Sept. 30 and June 30 ended with those dates in 1880, while the Reading figures and those of most other reports to Nov. 30 were to that date in 1880. The Census figures were thus for a year perhaps 4½ years earlier than that in the last Poor's Manual.

First we will examine the inventory of the property shown by these several reports—the miles of railroad and track and the quantity of rolling stock—which has been, according to Poor's Manual for the last three years and by the Census for 1880 :

	1884.	1883.	1882.	1880.
Miles of road	125,152	120,552	114,461	87,801
Miles of track	156,497	149,183	140,961	108,070
Track per mile of road	1.25	1.24	1.32	1.23
Miles of steel rails	90,243	78,401	66,601	37,329
Rolling stock :				
Locomotives	24,587	23,823	22,114	17,412
Passenger cars	17,993	16,889	15,551	12,330
Baggage, mail and exp. cars	5,911	5,948	5,366	4,475
Freight cars	798,399	738,660	710,451	455,450
Per 100 miles of road :				
Locomotives	19.65	19.75	19.31	19.83
Passenger cars	14.38	14.00	13.58	14.00
Baggage, mail and exp. cars	4.72	4.93	4.69	5.10
Freight cars	638.00	612.70	620.70	518.70

The increase in mileage is the *net* increase, as some railroad is abandoned nearly every year, and Mr. Poor found 64 miles of such abandoned railroad last year. The percentage of second track and sidings is a little greater now than in 1880, in spite of the fact that more than 37,000 miles of new railroad has been added, which must have had a much less proportion of such tracks than the average old road. This has been more than made up by very great additions on the old roads, which were unusually numerous and extensive for two or three years after 1879. The mileage of steel track meanwhile has increased no less than 142 per cent., which is not so remarkable, however, as it would have been had not 37,000 miles of new road been built, mostly with steel rails; while nearly all necessary renewals meanwhile were made with steel, and in the natural course of things the 70,000 miles of iron in 1880 in 4½ years should require not far from 30,000 miles of new rails. For the last two years the Manual shows an addition of about 12,000 miles of steel each year, which is in addition to the renewals of old steel by new. Of the whole track 34½ per cent. was steel in 1880 and 58 per cent. in 1884.

There has also been a great increase in equipment: while the increase in railroad from 1880 to 1884 was 42½ per cent., there was an addition of 41 per cent. to the locomotives, of 46 per cent. to the passenger cars, and of 75 per cent. to the freight cars, and the statement above of the number per 100 miles of railroad shows that in spite of the great addition of new railroads with light traffic, on the average there are about as many locomotives and passenger train cars now as in 1880, and 22 per cent. more freight cars. The latter statement seems hardly credible, especially as the traffic per mile has increased but little. The freight earnings per freight car, accepting the above figures, were $914 in 1880, $634 in 1882, $737 in 1883, and $630 in 1884—nearly one third less last year than four years earlier.

The capital representing this property is given as follows :

	1884.	1883.	1882.	1880.
Stock	$3,762,616,689	$3,708,060,583	$3,510,085,824	$2,619,606,264
Bonds	3,669,115,772	3,500,879,914	3,235,543,323	2,390,915,402
Other debt	249,666,595	268,927,280	271,170,960	421,200,894
Total	$7,676,399,054	$7,477,865,782	$7,016,750,109	$5,425,722,560
*Cost	6,924,554,444	6,684,756,045	6,035,090,146	4,838,645,675

These are enormous figures, and they have grown fast since 1880. Against the increase of $2,251,000,000 in capital since then, we have an addition of 37,351 miles of railroad, 48,427 miles of track, 52,914 miles of steel track, 7,175 locomotives, 5,663 passenger cars and 342,949 freight cars. It also covers very great and costly improvements of old roads, such as additions to their station grounds and buildings, the substitution of iron and stone for wooden bridges and culverts, etc., which are not shown by miles of road and quantity of rolling stock.

As to the discrepancy between capital and cost of road and equipment, it is largely accounted for by the cost of the stocks and bonds of other railroads held by many companies. These must be represented in the capital accounts of the companies owning them, as also in those of the companies issuing them, but when added together for the entire railroad system, they make the sum greater than the actual investment. Thus the Chicago & Northwestern issued $9,000,000 of bonds to pay for St. Paul & Omaha shares, and this increased the total amount of United States railroad bonds by so much, without any change in the amount of railroad property. It is as if a man should give his note for a thousand dollars in payment for another man's note for the same amount. This process might be repeated a thousand times, when there would be notes to the aggregate amount of a million dollars, all based on one piece of property sold for $1,000. The Census found that the railroad companies had invested $343,800,000 in the securities of other companies. The Pennsylvania Railroad Company alone has now $96,866,000 invested in such securities. It is important to bear this in mind when examining the amounts of stock and bonds per mile, which were :

Per mile :	1884.	1883.	1882.	1880.
Stock	$30,064	$30,739	$30,674	$30,117
Bonds	29,317	28,650	28,268	27,551
Other debt	1,995	2,230	2,370	4,854
Total	$61,376	$61,639	$61,312	$62,522
Cost	55,329	55,461	52,726	55,757

What is most noticeable here is the smallness of the changes from year to year. The increase in funded debt has about kept pace with the decrease in floating debt. Of course, the new road has not cost so much per mile as the old, but we must not forget the great expenditures for improving the old road. The average mile of railroad is certainly more costly to-day than it was four years ago. The statistics already given show that it has more second track and sidings and a much heavier equipment. The new railroad also is much better than was ever built new before, and some of it as good, or nearly so, as the best of the old railroads. It is a great mistake to suppose that because most railroads in this country did not cost more than $20,000 or $25,000 a mile in the first place, they have not cost much more now. On almost every one there is an addition to the cost yearly, and while there are hundreds of millions of clear water in stocks, there are also not a few companies whose properties could not be reproduced to-day for anything like the amount of their stocks and bonds.

* Of road and equipment, *not* stocks and bonds purchased.

The traffic of the railroads of this country has been, in *millions* of train miles, passenger miles and ton miles :

Total:	1884.	1883.	1882.	1880.
Train miles:				
Passenger	206.5	187 9	165.4	138.2
Freight	334.8	350.1	305.1	251.0
Total	541.3	538.0	470 5	389.2
Passenger miles	8,778.6	8,541.3	7,483.1	6,189.2
Ton-miles	44,725.2	44,064.9	39,302.2	32,348.8
Per mile of road :				
Pass. train miles	1,825	1,757	1,728	1,575
Freight train miles	2,958	3,274	3,186	2,860
Total train miles	4,783	5,031	4,914	4,435
Passenger miles	77,568	79,872	78,105	65,392
Ton miles	395.186	412,052	410,458	368,514
Equal to each way daily over all roads :				
Number passenger trains	2.50	2.41	2.37	2.20
" freight trains	4.05	4.48	4.37	3.92
" all trains	6.55	6.89	6.74	6.12
Number passengers	106	109	107	98
" tons freight	541	564	562	510

This shows a great and uninterrupted increase in passenger traffic, which was 42 per cent. greater in 1884 than in 1880, and even 2¼ per cent. greater than in 1883; but the passenger train mileage increased still more—from 1883 to 1884 10 per cent., and from 1880 nearly 50 per cent. The increase in freight traffic (ton-miles) has been 38 per cent. since 1880 and 1½ per cent. since 1883, to carry which there has been an increase in freight train miles of 33½ per cent. since 1880, but a decrease of 4½ per cent. since 1883, making the average train loads :

	1884.	1883.	1882.	1880.
No. passengers	42.5	45.4	45.1	44.7
No. tons freight	133.7	125.9	128.8	128.8

While the average distance carried was :

Miles :				
Passengers	26¼	27⅛	25⅞	23
Freight	114⅜	110	109	112

Per mile of road the passenger traffic was a little less in 1884 than in 1883 or 1882, but was 18½ per cent. more than in 1880; the freight traffic was 4 per cent. less than in 1883 or 1882, but 7 per cent. more than in 1880.

The train movement seems very light, being equivalent to but 2½ passenger trains and 4 freight trains each way daily.

The earnings and expenses have been :

Earnings :	1884.	1883.	1882.	1880.
Passenger	$206,790,701	$206,837,256	$188,137,462	$144,101,709
Freight	502,869,910	544,569,831	485,778,831	416,145,758
Other	53,645,997	55,705,693	54,071,517	20,203,127
Total	$763,306,608	$807,112,780	$727,987,310	$580,450,594
Expenses	496,792,697	515,525,192	463,168,541	352,800,120
Net earnings	$266,513,911	$291,587,588	$264,818,769	$227,650,474

The passenger earnings in 1884 were nearly the same as the year before, but were 43 per cent. more than in 1880; the freight earnings were 7½ per cent. less than in 1883 and 28 per cent. more than in 1880. The working expenses were 3½ per cent. less than in 1883, and 40 per cent. more than in 1880. The net earnings were 17 per cent. more than in 1880, but 8½ less than in 1883, and only about as much as in 1882.

Per mile of road, train-mile and units of traffic, the earnings and expenses were :

Per mile of road : Earnings :	1884.	1883.	1882.	1880.
Passenger	$1,801	$1,951	$1,926	$1,660
Freight	4,382	5,092	4,824	4,995
Other	480	598	627	233
Total	$6,663	$7,641	$7,377	$6,688
Expenses	4,345	4,939	4,707	4,065
Net earnings	$2,318	$2,702	$2,670	$2,623
Per pass. train-mile :				
Gross earn	$1.00	$1.11	$1.14	$1.19
Expenses	0 77½	0.80	0.82½	0.76
Profit	0.22½	0.31	0.31½	0.43
Per freight train-mile :				
Gross earn	1.50	1.56	1.59	1.65
Expenses	1.00½	1.04	1.07	0.98
Profit	0.49½	0.52	0.52	0.67
Per passenger-mile :				
Expense	1.823	1.702	1.829	1.678
Profit	0.533	0.660	0 685	0.652
Receipt, in cents	2.356	2.422	2.514	2.330
Per ton-mile :				
Receipt in cents	1.124	1.236	1.236	1.290
Expense	0.758	0.738	0.787	0.760
Profit	0.366	0.498	0.449	0.530

The gross earnings per mile were 13 per cent. less

in 1884 than the year before, but nearly as great as in 1880, while the net earnings were 14 per cent. less than in 1883 and 11¼ per cent. less than in 1880. The profit per passenger train-mile has fallen off nearly one-half since 1880 and per freight-train mile one-fourth. The average rate per mile has increased slightly for passengers, but decreased as much as 13 per cent. for freight, and this decrease in the rate amounted to about $73,000,000 on the traffic of 1884. The expense per unit of traffic increased somewhat for passengers and was very little changed for freight.

The returns on the investment are indicated below :

	1884.	1883.	1882.	1880.
Net earnings per cent. on capital.....	3.47	3.90	3.77	4.20
Average net paid on debt..	4.51 p. c.	4 59 p. c.	4.40 p. c.	4.82 p. c.
Av. dividend on shares...	2.48 "	2.75 "	2.91 "	2.70 "

The full year 1880 was probably the most favorable our railroads have ever had, but the Census year was enough earlier to be distinctly less favorable ; on the other hand, the Manual year 1884 was more favorable than the calendar year 1884, and still more so than the year to July or August of this year.

"CEYLON RAILWAYS" AND A FEW OTHERS.

The world moves so fast nowadays that it is difficult to keep track of its progress, and any one may be pardoned for forgetting some of the newer or more important advances, even in a department where he expressly attempts to summarize the work of the world. When, however, we find, coming from a source usually entitled to respect, an attempted summary of a particular kind of works in which more are forgotten than remembered, including not only recent works, but works 20 or 30 years old, and not only works far away but those near at home, we may reasonably be somewhat astounded at such a plentiful lack of information. The London *Engineer* of July 17 contains an editorial on "Ceylon Railways," comparing the great works on them with others which the rest of mankind has attempted, which is fairly open to this criticism, since it betrays a surprising ignorance of what has been done in other parts of the world.

The article is descriptive of the works on 130 miles of line which we are assured "are among the heaviest which have ever been undertaken, and the fact that this comparatively short length of line reaches an altitude of 5,291 ft. must suffice to afford evidence that the obstacles to be overcome have been of a decidedly serious nature." The first 50 miles, we are told, are on a level, but then "the ascent is commenced by the great Kadugannawa incline, the successful engineering of which did such great credit to the skill of its designer, Mr. G. L. Molesworth, M. Inst. C. E., the present Director-General of Indian State Railways. This incline carries the traffic to an elevation of 2,000 ft. above sea level, over an incline of 11¾ miles, with a total rise of 1,388 ft., to attain which a continuous gradient of 1 in 45 [2.22 per cent., or 117 ft. per mile] had to be adopted, while the sinuosities of the mountain spurs enforced curves as low as of 660 ft. radius [8 deg. 41 min.].

"Severe as are the conditions under which this incline had to be constructed and worked," on which it was thought that "the limit of gradients and curves had been reached, so as to insure a possibility to safe and economic working of very heavy traffic" [for Ceylon], "they are surpassed by those which have had to be contended with in the extension," where we are gravely told that "the boldness of the engineers has been taxed to the utmost in the provision of means to overcome them," in part because of the severe exactions that "no reversing stations [meaning, apparently, switch-backs] were permitted, *still less any break of gauge*, while the passage of the rolling stock from the low country *was to be continuous*. We find, therefore, that to meet these requirements, curves of as low a radius as 300 ft. [19 deg. 10 min.] had to be adopted, and these upon inclines of 1 in 44 [2.27 per cent., 180 ft. per mile]. The curvature was of almost continued reversal to enable the line to wind in and out of the mountain spurs."

Pausing for a moment to contemplate the excellent judgment shown in building two contiguous inclines (only 17 miles apart) of the same general character and over which "the passage of rolling-stock was to be continuous," with a limit of curvature of only 8 deg. 41 min. on one and of 19 deg. 10 min. on the other, neither of the grades, it would appear, being reduced for curvature, "we shall, perhaps, best convey an idea of the character of the works now terminated," and also of the exaggerated importance attached to them, "by placing before our readers in a tabular form the particulars of the several great inclines of the world" [so far as the same appear to be known to the editor and those who furnished him his information], "in comparison with those on the Ceylon Railway," of which it is undeniably true that "its extreme curves and gradients, when associated, show a severity not met with on any other of the works *contained in the list*," although one can only wonder where an engineer or engineering editor can have been who thinks that on their account "we may feel proud of the advance of engineering science which has rendered their adoption possible and successful."

Here, at any rate, is the list, in which an attempt is made to contrast all the rest of the works which the planet has to show with "one of the heaviest works of railway construction as yet attempted:"

NAME OF INCLINE.	Length of incline..... Miles.	Total rise in feet.....	Average gradient.....	Steepest gradient.....	Sharpest curve in feet.	Length of tunnels ..... Miles.
Giovi..	6	884	1 in 36	1 in 29	1,320	2.25
Semmering....	13¼	1,325	1 in 47	1 in 40	660	2.66
Bhore Ghaut.....	15⅞	1,831	1 in 48	1 in 37	1,000	2.26
Alleghany..	15	1,690	1 in 47	.....	600	....
Tabor (Chili).....	12	1,360	1 in 46½	1 in 44¼	604	....
Kadugannawa(Ceylon)	11¾	1,388	1 in 45	1 in 45	660	.88
Ambagamuwa "	19	2,227	1 in 45	1 in 44	300	.30

[In addition to this list there is to be an extension of the same Ceylon Railway which "will also involve a further incline of 12 miles rising 1,359 ft., on which an average gradient of 1 in 46½, with a maximum of 1 in 44, will be compulsory, as will also the adoption of curves as sharp as 300 ft."]

Let us endeavor to add a few items to this list. It is a little difficult to understand in what the especial greatness of the works mentioned is supposed to consist ; whether in the altitude attained and length of ascent alone, or in the "heaviness" of the works by which good alignment was attained, or in the "boldness" with which "extreme curves and gradients" were used. Apparently, the latter excites the greatest admiration, but whatever it may be, some interesting additions may be made to the list, as thus :

Mexican Railway.—Rises 6,412 ft. in 53.9 miles, 4 per cent. maximum grade (2½, average), with 325 ft. curves radius (17° 40') and 16 tunnels. In this distance it also rises 2,372 ft. in 12.58 miles, 3.57 per cent. average grade and 4 or 5 tunnels.

The air-line distance between the extreme points of this latter section is less than four miles, but it includes the *Bota*, or boot, so-called from its shape, nearly eight miles long and rising to a point on the slope of the mountain which to the eye seems almost vertically over the point at which the "boot" began 1,650 ft. below, and which is certainly not over one mile distant from it horizontally, giving an outlook which is even more startling to the engineer than to the average traveller.

Oroya Railroad, Peru.—Rises 3,952 ft. in 26 miles on 2½ per cent. (1 in 40) maximum grade, *to reach the foot of the main grade ;* then

Rises 12,845 ft. in 71 miles, on 4 per cent. grade, with 14½ degree curves (396 ft. radius), to an elevation of 15,645 ft., with 42 tunnels.

On this line, it is true, there are several switch-backs, but the first 13 miles rises 2,105 ft. without any switch-back, and we apprehend that there are still longer stretches on the ascent without any.

There are one or two other lines in Peru of the same general character, but rising to less elevations.

If these are too far away to be visible from Ceylon, a few European examples, at least, of "great inclines" might be supposed to be known, such as these:

St. Gotthardt.—Rising 2,750 ft. in 20¼ miles ; 142.5 ft. per mile maximum grade (2.7 per cent.); 130 ft. average grades. Also, rising 2,090 ft. in 15¼ miles, with 28 per cent. of the distance tunnels, including (on both these inclines) seven spiral (or more properly, helicoidal) tunnels turned into the mountain to gain distance.

Brenner.—Rising 2,584 ft. in 22½ miles, 132 ft. per mile (2.5 per cent.) maximum grade; 114.6 ft., average.

Other examples of "great inclines" might be taken from Europe, but let us return to our own country :

Southern Pacific.—Rises 2,674 ft. in 25.4 miles ; 116 ft. per mile (2.20 per cent.) maximum grade, 10 degree (573 ft.) maximum curve ; 11 tunnels ; including a "loop" or more properly, spiral or helix, 3,800 ft. long and rising 78 ft.

Denver & Rio Grande, Marshall Pass.—Rises 3,675 ft. in 25 miles, 4 per cent. (211 ft. per mile) maximum grade ; 24 degree maximum curve. Height of summit, 10,852 ft. above the sea ; also :

La Veta Pass.—Rises 2,368 ft. in 15 miles ; same grades and curves as above. Height of summit, 9,339 ft.

The locomotive whistles and the eagle screams on still two other remarkable summits on this remarkable railroad, viz., Fremont Pass, 11,540 ft. above the sea—the highest point reached by the locomotive anywhere in the world except in Peru—and the Tennessee Pass, 10,418 ft. high, but we have not the data at hand as to the precise length of the grades which ascend to them. We believe the rate of grade is 4 per cent.

If the particular "advance of engineering science" of which *The Engineer* "feels proud," lies in the severity of the grades and curves on the Ceylon Railways, we may instance another veritably "great incline" on this same road:

Calumet Mine Branch, Denver & Rio Grande.—Rises some 2,700 ft. in seven miles on an 8 per cent. grade (nearly 406 ft. per mile) with 25 degree maximum curves (231 ft. radius).

This unparalleled line is used to bring ore to the Bessemer steel works at Pueblo, and is operated by one train per day each way. It is undoubtedly the heaviest grade on any regularly operated railroad in the world, although 10 per cent. temporary grades (528 ft. per mile) were successfully operated for over two months over the Kingwood Tunnel of the Baltimore & Ohio Railroad by the late Benj. H. Latrobe as early as 1852.*

These latter lines are, it is true, narrow-gauge, but comparison with the other lines mentioned will show that they are not essentially different in any of their details, from similar lines of standard gauge, and need not remain narrow-gauge unless they choose.

If, on the contrary, *The Engineer's* pride lies in the ease of the curves and grades, for so long and difficult an incline, besides the Southern Pacific grade already mentioned, may be given the following :

Mexican National.—Rises 2,628 ft. in 17 miles; on 3.8 per cent. (201 ft. per mile) maximum grade ; 15 degree (383 ft. radius) maximum curves ; with a descent of 1,325 ft. in nine miles on a 3.5 per cent. grade on the other side of the summit. Laid to narrow-gauge, but expressly built throughout to be adapted to standard gauge. Also, on same road :

Mexican National. Northern Division.—Monterey to Saltillo. Rises 3,465 ft. in 54 miles, at an average rate of 64 ft. per mile, most of the rise, however, concentrated on a short portion of the distance on grades (if we recall them correctly) of 2½ per cent.

All the examples so far mentioned exceed the greatest of the "great inclines of the world," which appear to be known to *The Engineer*. To give a list of those which exceed the smallest, or even the average, of the list, would be an almost endless task, which we shall not attempt. The following, however, are a few :

Tyrone & Clearfield.—A little branch of the Pennsylvania Railroad. Rises 1,064 ft. in 10 miles. Tangent maximum, 138 ft. per mile.

Central Pacific.—Rises 992 ft. in 13 miles; 2 per cent. (105.6 ft. per mile) maximum grade; 10 degree curves; eight tunnels.

Northern Pacific.—Rises 1,668 ft. at 116 ft. per mile (2.2 per cent.) in an air-line distance of 13 miles.

Mexican Central.—Rises 1,750 ft. in 19 miles at San Juan del Rio with easy grades and curves and 1,650 ft. at Zacatecas.

Neither have we included lines not yet built or only partly completed, although it is obvious that so far as the "advance of engineering science," in the matter of "great inclines," is concerned, a line which has been definitely located, on grades and curves in successful use elsewhere, is to all intents and purposes a completed line, so far as engineering science is concerned, although hardly from a business point of view. Had such lines been mentioned a long list like the following might have been made up :

Luckmanier Pass (near the St. Gotthardt).—Rises on a development of 29½ miles *between two points six miles apart*, on a maximum grade of 132 ft. per mile (2.5 per cent.), implying a ascent of something less than 3,900 ft ,† with maximum curves of 984 ft. radius (5° 49').

Mexican Central.—Two lines ascending from the coast to the central plateau of Mexico, one from the Gulf of Mexico at Tampico and the other from the Pacific at San Blas, both of which rise some 4,500 feet on 2 to 3 per cent. grades, and both of which were recently under active construction. The Mexican National has a similar line projected and begun from Manzanillo to the plateau, but its surveys have not been fully completed.

Vera Cruz to City of Mexico via Jalapa.—A line located in 1881 by American engineers between the same termini as the Mexican Railway before referred to and some miles shorter (about 258 against 263 miles). Rising 7,323 ft. (2,232 metres) in one un-

* For a full and most interesting account of these and other works, by Mr. Latrobe, see *Railroad Gazette*, Dec. 5, 1874.

† *Railroad Gazette*, 1880, page 342. The writer cannot give the exact feet of rise.

broken 2 per cent. (average) gradient* for 72.64 miles (116.9 kilometres) or from an elevation of 600 ft. to an elevation of 7,923 ft. above the sea.

This last line, the maps and profiles of which, to usual working scales, are now in this office, where they may be inspected by the curious, is claimed by the Chief Engineer of the line to be by long odds the longest single "great incline" which has ever been located or built. As compared with the existing Mexican Railway, it rose to a summit 1 ft. lower, on a 2 per cent. instead of 4 per cent. maximum grade, with one tunnel (328 ft. long) instead of 16; with 20 degree curves (289 ft. radius) instead of 325 ft. radius, and with an estimated cost, for 199.84 miles of the 258 miles, of $4,630,824.14; all the remainder of the line being on the upper plateau and mere surface work, as in fact was the entire line except the 72.64 miles of unbroken mountain grade. The existing Vera Cruz line ranks among the heaviest in the world, and its cost is officially reported at £8,373,236 : 1s. : 5d.†

Taking all these lines together, they make a formidable addition to the list of "great inclines," and leave room to wonder how the works of the Ceylon Railway could have been considered so very remarkable, either in Ceylon or in London. Perhaps, however, the advance of engineering science of which *The Engineer* feels so proud is not that such works are possible, but that the knowledge of their possibility should have penetrated so far as to the Public Works Department of India, and in this pride we can join. It is certainly, from some points of view, a remarkable advance.

In spite of their low rates the railroads have carried but a small amount of grain from Buffalo since the canal opened, only 4,593,401 bushels in the 14 weeks to Aug. 15, against 15,192,477 bushels shipped by canal in the same time—not one-fourth of the whole by rail. In the last ten of these weeks, which includes the time of lowest rates, the shipments by rail were only 2,869,122 bushels—not a large week's business.

The railroads make a better comparison with the lake vessels, as is natural when the movement is small, because there are included in the shipments those of the inland towns, St. Louis and Peoria, which cannot ship by lake. For the first seven weeks after the opening of lake navigation more was shipped by rail than by lake, but only once in the last eight weeks has this been the case. The total shipments for each of these periods have been;

	By rail.	By Miss. Riv.	By lake.	Total.
7 weeks to June 20	20,127,710	858,773	14,055,713	35,042,196
Per cent	57.4	2.5	40.1	100.0
8 weeks to Aug. 15	11,561.421	785,071	15,784.552	28,131,044
Per cent	41.1	2.8	56.1	100.0

The weekly average of the total shipments was 5,006,000 bushels down to June 20, and 3,526,000 since.

The railroads have rarely carried so little grain as in this latter period of exceptionally low rates, but last year they did quite as little, while the total shipments were much larger; but then for half of the time rates were much higher than this year.

Pennsylvania Railroad Earnings in July.

The July report, like the June report, is unfavorable, and in comparison with previous years more so, though not in comparison with previous months of this year.

For 13 successive years the July earnings and expenses of the lines east of Pittsburgh and Erie have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1873	$3,203,462	$2,251,913	$951,549
1874	3,181,785	1,961,160	1,220,625
1875	3,073,103	1,913,126	1,159,577
1876	2,921,284	1,857,589	1,063,695
1877	1,880,337	1,400,976	479,361
1878	2,536,733	1,485,670	1,051,063
1879	2,782,906	1,783,291	999,615
1880	3,449,644	2,147,139	1,302,505
1881	3,780,418	2,289,447	1,490,971
1882	4,149,150	2,502,057	1,647,093
1883	4,130,950	2,638,216	1,492,734
1884	3,989,085	2,597,969	1,391,116
1885	3,685,105	2,525,056	1,160,049

Compared with last year and with 1882 (when gross and net earnings were largest), the decreases are:

Since 1884:	Gross earnings.	Expenses.	Net earnings.
Amount	$303,980	$72,913	$231,067
Per cent	7.6	2.8	16.6
Since 1882:			
Amount	464,045	(Inc.) 22,999	487,044
Per cent	11.2	0.9	29.6

Nearly two-thirds of the decrease in gross earnings since 1882, and nearly half of the decrease in net earnings, took place this year, when the gross earnings were the smallest since 1880 and the net earnings the smallest since 1879, and smaller even than in 1874.

The surplus of net earnings over all liabilities or the deficit in meeting them of the roads *west* of Pittsburgh and Erie in the month of July has been, for seven years:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
Deficit.	Surplus.	Surplus.	Surplus.	Surplus.	Surplus.	Deficit.
$3,421	$316,823	$231,007	$319,567	$121.972	$51,695	$127,637

This western system has not showed a deficit in July before since 1879, and, compared with last year, the decrease is $179,332. Adding the surplus to and subtracting the deficit from the net earnings of the eastern system, we have as the company's income from both systems in July:

1879	$996,194	1883	$1,614.706
1880	1,619,328	1884	1,442,811
1881	1,721,978	1885	1,032,412
1882	1,966,660		

These profits, which is what is available for paying interest on the bonds and dividends on the stock of the Pennsylvania Railroad Company, were 28 per cent. less than last year, 36 per cent. less than in 1883, and 47½ per cent. less than in 1882. The decrease from last year is equal to more than 0.4 per cent., and the decrease from 1882 to nearly 1 per cent on the present amount of stock.

For the *seven months* ending with July the gross and net earnings and working expenses of the lines *east* of Pittsburgh and Erie have been, for nine years:

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$16,216,733	$11,007.953	$5,208,780
1878	16,988,671	10,591,710	6,396,961
1879	18,196.964	11,351.494	6,845,470
1880	22,883,715	13,486.801	9,396,914
1881	25,334,257	14,846,132	10,488,125
1882	26,799,999	16,962,783	9,837,216
1883	28,483,532	18,471,971	10,011,561
1884	27,322,337	17,818,978	9,503,359
1885	25,004,701	17,324,791	7,679,910

Compared with last year and the year before, the decreases are:

Since 1884:	Gross earnings.	Expenses.	Net earnings.
Amount	$2,317,636	$494,187	$1,823.449
Per cent	8.5	2.8	19.2
Since 1883:			
Amount	3,478,831	1,147,180	2,331,651
Per cent	12.6	6.2	23.3

Two-thirds of the decrease in gross earnings since 1883 and three-fourths of the decrease in net earnings occurred this year

The surplus or deficit for the seven months of the lines *west* of Pittsburgh and Erie has been:

1879	Deficit, $422,758	1883	Surplus, $337,646
1880	Surplus, 1,657,930	1884	Deficit, 713,160
1881	" 1.755,871	1885	" 1,013,645
1882	" 355,030		

The decrease in the profits of this system since 1881, when they were largest, is no less than $2,769,516.

Adding the surplus of this western system to and subtracting the deficit from the net earnings of the eastern system, we have as the income from both systems:

1879	$6,422,712	1883	$10,349 207
1880	11,054.844	1884	8,790,199
1881	12,243,996	1885	6,666,265
1882	10,192.246		

The decrease in these profits is, since—

1880.	1881.	1882.	1883.	1884.
$4,388,579	$5,577,731	$3,525,981	$3,682.942	$2,124,934

The decrease since last year is equal to 2¼ per cent. on the capital stock. The decrease since 1880 is equal to 6⅜ per cent. on the stock then outstanding. The decrease from 1881 is equal to 7⅜ per cent. on the larger amount of stock then outstanding.

No railroad company in the country will gain as much by the restoration of through trunk line rates as this one, as it has not only a larger eastern system than any other trunk line company, but gets profits and losses from more than 3,200 miles of lines west of Pittsburgh and Erie, including some of the largest carriers of through traffic, and has very large investments in the Northern Central and the Philadelphia, Wilmington & Baltimore, which also have a large through traffic on which rates have been unprofitable this year. The income from these investments, of course, is not shown in the above statement of earnings, but we may be sure that it will not increase when the above net earnings decrease.

As for the remainder of the year, the result depends largely on what is done about through rates. The prospect for crop movement is less favorable than last year, this company's western lines traversing a very large part of the winter wheat country, which had a very large crop last year and the poorest ever known this year. The probable very large corn crop will not come forward this year, though it may cause large shipments of last year's corn, and thus offset to some extent the loss in wheat. Any improvement in the demand for iron, coal and coke would be of great advantage to this company. Last year the decrease in the profits of the two systems was nearly the same in the last five months as in the first seven months, the western lines doing better in the last half of the year, but the eastern lines losing much more then, the decreases from 1883 to 1884 being:

	Eastern system.	Western system.
Seven months to July 31	$508,202	$1,050,806
Five months to Dec. 31	787,998	623,754
Year	$1,296,200	$1,674,560

Through rates were much demoralized in the latter months of last year, but they were much better then than they are now. An immediate restoration of these rates would probably make this traffic, even if smaller than last year, more profitable than then, and very much more profitable than it has been so far this year. It is too late to prevent a considerable decrease in August, but for the remainder of the year there may be no further decrease in this company's profits, if the local traffic is as good as last year.

July Accidents.

Our record of train accidents in July, given on another page, contains brief accounts of 31 collisions, 40 derailments and 5 other accidents; a total of 76 accidents, in which 28 persons were killed and 75 injured.

Nine collisions, 6 derailments and 1 other accident caused the death of one or more persons; 6 collisions and 8 derailments caused injuries, but not death. In all, 16 accidents caused death and 14 injuries, leaving 46, or 60½ per cent. of the whole number, in which there was no injury serious enough for record.

The 31 collisions caused 14 deaths and 34 injuries; the 40 derailments killed 13 persons and injured 41, while in the 5 other accidents 1 person was killed.

Twenty of the persons killed and 38 of those injured were railroad employés, who thus made up 71 per cent. of the killed, 51 per cent. of the injured and 57 per cent. of the whole number of casualties.

As compared with July, 1884, there was a decrease of 13 accidents, an increase of 3 killed, and a decrease of 67 persons injured.

These accidents are classed as to their nature and causes, as follows:

Collisions:		
Rear	23	
Butting	7	
Crossing	1	
		— 31
Derailments:		
Broken bridge	5	
Spreading of rails	3	
Broken wheel	2	
Broken axle	4	
Broken truck	2	
Accidental obstruction	1	
Cattle	3	
Wash-out	4	
Misplaced switch	3	
Open draw	1	
Malicious obstruction	2	
Unexplained	10	
		— 40
Other Accidents:		
Boiler explosion	1	
Dynamite maliciously put on track	1	
Loose freight-car door	1	
Broken parallel rod	1	
Broken axle, not causing derailment	1	
		— 5
Total		76

Five collisions were caused by trains breaking in two; two by misplaced switches; one each by failure to obey orders, by failure to use signals to a following train, by a runaway engine, by cars left on main track carelessly, and by cars blown out of a siding upon the main track

A general classification of these accidents may be made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road	..	8	..	8
Defects of equipment	6	8	4	18
Negligence in operating	24	8	..	32
Unforeseen obstructions	1	4	..	5
Maliciously caused	..	2	1	3
Unexplained	..	10	..	10
Total	31	40	5	76

Negligence in operating is charged with 42 per cent. of all the accidents, defects of equipment with 24, and defects of road with 10½ per cent.

A division by classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	4	10	3	17
To a pass. and a freight	9	..	..	9
To freight trains	18	30	2	50
Total	31	40	5	76

This shows accidents to a total of 107 trains, of which 30, or 28 per cent., were passenger trains, and 77, or 72 per cent., were freight trains. Construction and service trains are included with freight.

Of the total number of accidents 51 are recorded as happening in the hours of daylight and 25 at night.

The month shows a small number of accidents for midsummer, when climatic causes, such as sudden and violent storms, usually combine with stray cattle, pressure of passenger and excursion traffic and other causes to swell the list of accidents. This year traffic was not unusually large, and while many local storms are on record, they caused fewer accidents than usual. Ordinary causes of accident appear in smaller numbers than generally, misplaced switches, for instance, being responsible for only five accidents, two collisions and three derailments. The number of broken bridges is perhaps partly due to weakening of supports by water.

Train-wreckers caused three accidents. In one case they resorted to dynamite, almost a new appliance in this country, but were not successful in derailing a train, although the explosion damaged the locomotive badly and threw a rail from the track out of place.

For the year ending with July the record is as follows:

	Accidents.	Killed.	Injured.
August	89	38	112
September	100	21	174
October	105	39	170
November	96	47	130
December	105	24	109
January	145	24	182
February	216	44	250
March	86	17	84
April	81	14	75
May	62	8	65
June	75	24	115
July	76	28	75
Total	1,236	328	1,550
Total, same months, 1883-84	1,406	415	1,966
" " " 1882-83	1,631	470	1,836
" " " 1881-82	1,313	392	1,407

The monthly average for the year was 103 accidents, 27 killed and 129 injured, July being below these averages, except in the number killed. The yearly average for the four years was 1,397 accidents, 401 killed and 1,690 injured. The year closing with July was thus below the average of the four.

The averages per day for the month were 2.45 accidents, 0.90 killed and 2.42 injured; for the year they were 3.39 accidents, 0.90 killed and 4.25 injured.

The average casualties per accident were, for the month, 0.368 killed and 0.987 hurt; for the year, 0.265 killed and 1.254 injured. July had a very light list of injured, having

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* Interspersed in this gradient were some seven short breaks of grade, aggregating 3 29 miles, in part for station grounds and in part intended to be taken out in compensating for curvature, and therefore not fairly breaks in grade. The line was located by Mr. A. M. Wellington, Chief Engineer.

† This cost was largely increased by political and other causes and by expenses due to war and tumult. The line could probably be built to-day for about half the above sum, or perhaps even less. The line via Jalapa was examined and reported impracticable without excessive grades and curves.

been exceeded, in fact, by ten months out of the past twelve and equaled in one of the remaining two, May alone showing a small number.

Iron Cabs.

While we have adhered to wooden cabs as being the most comfortable, European engineers have always considered that iron cabs are the strongest and most durable, and have therefore used them exclusively. As we announced in a paragraph in a recent issue, the elevated railroads are about to try iron cabs, finding that wooden cabs shake to pieces in five years. Iron cabs are rather hotter in summer and colder in winter, but any difficulty on this score can be minimized by making the sides and front of iron, with a stout angle-iron cornice and a couple of angle-iron rafters. The roof can then be made of wood, the boards being held together by a frame and iron straps, which at intervals are bolted to the cornice and rafters. When the roof needs repair, it can then be removed bodily without disturbing the rest of the cab.

In constructing an iron cab, care should be taken to make a good job of any horizontal joints in the plates. A single butt strap, double-riveted, can be used with advantage, as ⅛ in. plates well jointed will be quite as stiff as ¼ in. plates indifferently secured. The lateral and fore-and-aft oscillations of the engine throw a strain on the horizontal joints, which a single row of small rivets, imperfectly filling the holes, is scarcely calculated to resist. A well-built iron cab is practically indestructible, and will last as long as any part of the engine, requiring only periodical painting to keep it in good condition.

The History of Compound Locomotives.

In view of the very general attention which the question of compounding locomotive cylinders is attracting, the following record of the extent to which the subject has been investigated and experimented on will probably be read with interest. It will be seen that the subject has been studied for so long a time, by so many different persons and in so many different countries, that the weight to be attached to the progress so far attained is considerably greater than if even the same amount of work had been done by fewer individuals and in one country only.

For the data for preparing this account we are indebted to *Engineering*, in which journal a very long descriptive and historical account appeared on May 1. To the same journal we were indebted for the originals of the engravings which appeared in our last issue, for which, by accident, credit was not given.

The history to date of compound locomotives has been in brief as follows:

1850. John Nicholson, driver on Eastern Counties (now Great Eastern) Railway, originated the idea and brought his system to the notice of Mr. James Samuel, Locomotive Superintendent. Two cylinders of same stroke, with piston area as 1 to 2, were coupled to one axle in the usual way. High pressure cylinder cut-off at half stroke. Steam admitted direct to both cylinders for starting. Half the steam expanded four-fold and half eight-fold.

1852. Two engines of the above type running, and continued in use some years, but no more built. The principle has been applied to and is now largely in use for marine engines, giving very good results. Nothing further done until—

1866. Jules Morandiere (Northern Railroad of France) designed an eight-wheeled engine, coupled in two groups; the rear driven by a single inside high-pressure cylinder, the front by two outside cylinders; with provisions for high pressure in all cylinders for starting. No engine of this type ever built. Nothing further done until—

1876. Anatole Mallet, who had been studying the matter for some time, built the locomotives for the Bayonne & Biarritz Railroad (described in *Railroad Gazette*, Dec. 21, 1877), with two outside cylinders of unequal diameters (9.45 and 15.75 in., 17.72 in. stroke) and independent cut-off gear (when and if desired) for each cylinder. These engines proved very successful, and were followed next year by engines for the Haironville Railroad (narrow gauge) and for various tramways, and later by engines for the Paris & Orleans, Northern of Spain, and various German and Russian lines. Experiments on the Southwest Russian line by M. Borodin, Engineer-in-Chief, showed 10 to 20 per cent. fuel economy with only 112 lbs. initial boiler pressure. The engines were steam-jacketed, and experiment showed best results without using steam in the jackets. This, however, is the reverse of marine engine experience.

1878. F. W. Webb, Locomotive Superintendent London & Northwestern Railway, converted an old engine into a Mallet compound, and worked it experimentally five years with sufficiently satisfactory results to lead to further efforts.

1879. First compound (Mallet) engine in Austria, on Emperor Ferdinand Northern line.

1880. First compound engine in Germany, on Hanoverian State Railroad. Four small tank engines, two of ordinary type and two compound (Mallet type), designed by Herr von Borries. Trials showed 13½ to 20 per cent. economy in favor of the compound. Their success led to the immediate building of two other and larger ones.

1881-2. F. W. Webb built at Crewe Works the first engine, "Experiment," of the type herewith illustrated, being the first engine of compound type in which an effort was made to take advantage of the system to dispense with coupling-rods. Cylinders 11½ and 26 in. by 24 in. stroke. Joy valve-gear; 6 ft. 6 in. drivers. Ran 528 continuous miles on its "christening trip." Results being most satisfactory, a number of other slightly larger engines (13 in. instead of 11½ in. high-pressure cylinders, the low-pressure remaining the same) were built.

1884. London & Northwestern tank engines, built originally for the Metropolitan Railway of London, compounded on the Webb system, making the following contrast of new and old dimensions:

Particulars of 5 ft. 9 in. Metropolitan Engine.

		Non-compound.	Compounded.
Cylinders		17 × 24 in.	13 and 26 × 24 in.
Barrel of boiler		48 in. × 10 ft. 3 in.	46½ in. × 10 ft. 6 in.
Length bet. tube-plates		10 ft. 6⅝ in.	10 ft. 9 in.
Fire-box		6 ft. × 3 ft. 2 in.	4 ft 9 in. × 3 ft. 1½ in.
Depth do		(mean) 5 ft. 2 in.	5 ft. 5½ in.
Tubes		164, 2 in. (ext.)	177, 1⅞ in.
Heating surface	tubes	903 sq. ft	934 sq. ft.
	fire-box	111 "	94 "
	Total	1,014 sq. ft.	1,028 sq. ft.
Grate area		13.1 "	14.6 "
Heating surface to grate area		77 to 1	70 to 1
Boiler pressure		120 lbs.	150 lbs.
Wheel base		18 ft. 9 in.	18 ft. 2 in.
Weight on	truck	24,300 lbs.	25,400 lbs.
	front drivers	39,200 "	40,400 "
	rear drivers	37,300 "	39,100 "
	Total	100,800 lbs.	104,900 lbs.

This engine between June 4, 1884, and March 20, 188 ran 34,014 miles, burning 23.5 lbs. per mile, including the usual allowance for raising steam, while the non-compound burned 31.4 lbs. per mile.

The International Inventions Exhibition.

It is to be regretted that American progress in the useful arts should be so sparsely represented at the International Inventions Exhibition held this year at London. Over 2,000,000 persons have already visited the exhibition, and before it closes on Oct. 31 the total attendance will probably be over 4,000,000. As announced in these columns before the exhibition opened, exhibitors have not been charged for space, and have in other respects been very well treated by the management, while the enormous attendance is the best possible guarantee that the exhibits will become widely known. It is to be feared that American manufacturers have missed a chance which is not likely to occur again for many years. The scope of the exhibition, including as it does all the enormous improvements and innumerable new processes in the mechanical arts evolved since 1862, presents a field in which Americans should particularly excel and justify our character as a pre-eminently inventive people.

It is understood that many possible exhibitors elected to await the American Exhibition to be held in London in 1886. That exhibition, even with the best arrangement, must lack many of the attractions which have made the successive annual exhibitions of fisheries, health and inventions, respectively, so wonderfully successful. A large and suitable site for an exhibition, with good railroad facilities, cannot be easily or cheaply found within reasonable distance of the centre of London, and when found would certainly lack the beautiful gardens, fountains, terraces, trees and permanent buildings of the Inventions Exhibition.

These permanent features permit of an unprecedented display of the electric light, which has never before been shown in so attractive a form. Not only are the fountains illuminated in changing colors by focussed beams of electric light, and the outlines of the buildings marked by thousands of incandescent glow lamps, but even the trees are covered with small colored electric lamps. When, toward night-fall, the current is suddenly turned on, and the whole gardens blaze with light and color, the scene seems to realize the dreams of the Arabian Nights. No less than 18,000 incandescent lamps are used in the gardens, while 404 arc and 5,530 incandescent lamps are used in the buildings. Messrs Siemens Bros. supplied the whole of the electric plant used in lighting the gardens, and a great variety of lamps and dynamos are used for lighting the building. The steadiness and excellence of the electric lighting is very noticeable, and will well repay a visit. The extent of the various installations can be judged from the fact that no less than 2,300 indicated horse-power is used for electric lighting alone.

At the Philadelphia Electrical Exhibition only 1,800 horse-power was used for all purposes, and, although the display of electric lights was very brilliant, the size and character of the exhibition building did not permit of so brilliant a display as at the Inventions Exhibition.

The space alloted to America is about one-third filled with American exhibits, which occupy considerably less space than that filled by Russia or China—countries which are not credited with a large amount of inventive go-aheadativeness. But, though small, the American exhibit is good and representative, comprising many well-known names, and the exhibit of the Waltham Watch Company excites more interest than any other in the Exhibition.

Mr. Marshall M. Kirkman, in answer to inquiries from many railroad men, says that it is not probable that he will ever write any more books or pamphlets on railroad subjects. He is too busy a man at present to spare the time for writing, and thinks too that his existing works cover for the present the field on which he is particularly competent to write.

In the account of "Some New Forms of Planimeters," published in our issue of Aug. 14, the name of the makers of the newer forms, Messrs. Luckhardt & Alten, Cassel, Germany, was omitted. The firm either has established, or is about to establish, agencies in this country for its improved forms, which we believe are covered by patent.

Seven more railroads have reported July earnings this week, three of which, all small roads, gain over last year, while the others lose, including the great Pennsylvania, with 19 times the earnings of the three which gain, and in the aggregate the decrease of the seven is 7⅜ per cent. The Des Moines & Fort Dodge, which has wonderful ups and downs, but always very light earnings, shows the large gain of 23¾ per cent.; the New York, Susquehanna & Western gains 3¾ and the South Carolina 3¼ per cent. On the other hand the Cincinnati, Washington & Baltimore loses 17¼ per cent., the Northern Central 13¾, the Pennsylvania 7½, and the Indiana, Bloomington & Western 3¼ per cent. The Pennsylvania earnings are fully discussed elsewhere. The Northern Central's for five years have been:

1881.	1882.	1883.	1884.	1885.
$440,811	$484,534	$474,524	$477,516	$411,722

being less this year than in any other of the five, while its net earnings have fallen off still more seriously, having been:

1881.	1882.	1883	1884.	1885.
$63,263	$204,398	$176,929	$171,256	$111,063

The decrease from last year was 35 per cent. and from 1882 46 per cent. The very small net earnings in 1881 were due to extraordinary expenditures.

We have now reported the earnings of 61 railroads in July, whose aggregate earnings were:

	1885.	1884.	Decrease.	P.c.
Earnings	$22,770,288	$23,208,307	$437,019	1.9

This is but a small decrease, and in spite of a somewhat larger mileage this year would not be noticeable if earnings had not been decidedly bad last year in July.

Chicago through rail shipments eastward for the week ending Aug. 22 and corresponding weeks of previous years, have been reported as follows, in tons:

1880.	1881.	1882.	1883.	1884.	1885.
36,241	58,226	27,687	38,500	34,405	33,299

The shipments this year were smaller than in any other except 1882, but were largely exceeded only in 1881.

The total shipments and the percentage going by each railroad in each of the last six weeks have been:

	July 18.	July 25.	Aug. 1.	Aug. 8.	Aug. 15.	Aug. 22.
Tons:						
Flour	5,044	2,754	2,134	2,609	1,826	2,077
Grain	19,128	9,778	7,528	15,773	10,737	20,881
Provisions	8,219	8,011	7,828	7,229	8,147	10,341
Total	32,391	20,543	17,490	26,111	20,710	33,299
Per cent.:						
C. & Grand T.	11 9	14.3	15.1	12.2	10.0	12.4
Mich. Cen.	17.4	8.8	8.2	31.7	23.8	18.5
Lake Shore	14.8	14.0	11.8	9.7	7.1	13.5
Nickel Plate	9.7	7.1	10.4	8.6	13.8	18 0
Ft. Wayne	19.0	23 7	23.7	16.8	15.4	14.1
Pan Handle	7 5	12.3	13.1	9.6	12.5	8.3
Balt. & Ohio	10.1	8.1	9 2	5 9	7.3	6.3
Ch. & Atlantic	9.6	11.7	8.5	4.3	10 1	8.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

The increase last week over the previous week was 64 per cent., chiefly in grain, the shipments of which were nearly doubled; but the provisions shipments were the largest since winter.

In the percentage the very large showing given by the Nickel Plate is noticeable, and the Lake Shore gained also, and though the Michigan Central lost, the three Vanderbilt roads together carried 50 per cent. of the whole, against 22.4 by the two Pennsylvania roads. The latter, however, carried 40½ per cent. of the provisions, and the Vanderbilt roads but 30⅜ per cent., of which 20.6 went by the Lake Shore. In fact four roads carried 79.2 per cent. of the provisions, the Fort Wayne 23.2, the Lake Shore 20.6, the Chicago & Grand Trunk 18.0, and the Chicago, St. Louis & Pacific 17.4 per cent., leaving 19.8 per cent. for the other four railroads. More than half the grain was carried by the Michigan Central and the Nickel Plate.

The indications are that rates were demoralized.

There was a much larger movement of new winter wheat in the second week of August than before this year, but after all the receipts were not what can properly be called large then. The wheat receipts of the principal markets receiving winter wheat have been for three years, for six weeks:

	Week ending—					
	July 11.	July 18.	July 25.	Aug. 1.	Aug. 8.	Aug. 15.
St. Louis:						
1885	126,686	161,927	318,837	373,900	263,626	638,960
1884	280,091	491,189	480,771	761,896	709,862	973,421
1883	119,957	298,146	540,946	704,691	755,156	806,040
Toledo:						
1885	61,009	32,080	70,913	258,556	376,588	540,820
1884	65,864	74,786	325,155	682,199	733,632	888,336
1883	74,829	44,979	133,702	411,136	898,474	1,096,571
Detroit:						
1885	75,395	28,066	45,785	98,919	229,261	303,382
1884	19,903	31,720	61,694	123,328	203,721	295,942
1883	18,925	18,931	16,157	28,120	43,924	117,273
Chicago:						
1885	321,486	284,204	264,311	215,508	201,631	231,698
1884	96,893	97,636	147,496	287,077	568,334	1,297,780
1883	126,767	124,436	127,760	249,336	353,713	331,704

The first of these weeks is the one when the St. Louis receipts usually begin to increase, and the last of them is the one when the receipts culminated at St. Louis and Toledo last year. It appears that in this last week St. Louis received more than a third less than last year, and more than a fifth less than in 1883, while at Toledo the receipts this year were 40 per cent. less than last year, and 50 per cent. less than in 1883. At Chicago the receipts in this second week of August were not one-fifth as great as last year, and were 30 per cent. less than in 1883. The wheat receipts of each of the four places for the entire six weeks in each of the last three years have been:

	St. Louis.	Toledo.	Detroit.	Chicago.
1885	1,887,045	1,339,966	780,808	1,518,2 8
1884	3,791,120	2,769,972	736,308	2,395,206
1883	3,224,896	2,049,691	243,330	1,313,716

In the first three of these weeks the Chicago receipts were more than twice as large this year as in any of the others; but in the last three, when the winter wheat has usually come forward in large quantities, its receipts were but 648,237 bushels, against 2,154,291 last year. At St. Louis the receipts have been half as great as last year, and 40 per cent. less than in 1883. At Toledo, not half as great as last year and but little more than half as great as in 1883. At Detroit only is the comparison favorable to this year, owing, doubtless, to the good wheat crop—the only good winter wheat crop in the West.

The following statement of the total wheat receipts of the

eight Northwestern markets (in which the spring wheat was nearly all old wheat, and formed a considerable part of the whole in some years) is as follows for the six weeks to Aug. 15:

1880.	1881.	1882.	1883.	1884.	1885.
17,146,173	9,138,783	16,057,693	8,460,970	12,527,936	7,612,287

Thus the receipts this year for the six weeks that they have been somewhat affected by the new crops were less than in any other year of the six, and not only 40 per cent. less than last year, 53 per cent. less than in 1882 and 56 per cent. less than in 1880, when the winter wheat crops were very large, but also 10 per cent. less than in 1883 and 16⅔ per cent. less than in 1881, when they were very small.

This is not a fair indication of what the wheat movement of the season will be, however, because, as has been said, it is too early for the new spring wheat to come forward (except possibly a little from Nebraska and Southern Iowa), and the spring wheat crop this year is above an average, and will be about as large as last year. It will not come forward largely until September, but probably will then, in spite of low prices, because it is largely produced in new country where the farmers are less able to hold their crops, because of their poverty, especially as in much of this country they have little else to sell, while in the winter wheat country wheat is only one of several of the resources of the farmers, and usually not the principal one.

A correspondent asks for information as to "the usual causes of track-spreading." To the best of our information and belief, track spreads because the forces tending to move it outward are greater than those tending to resist them. Rails usually "spread" by rotating on the outer edge of the flange, and are permitted to do so, usually, by the fact that the inside spikes have "lost their grip" by local decay. This goes on gradually, one tie after another, until, on badly maintained track, there are not enough to keep the rail in place, although an *efficient* spike on every third or fourth tie is ample for this purpose. It is not uncommon, even on fairly good track, to find a third or even half of the spikes so loosened that they have been lifted a half or quarter of an inch above the rail and are of no real service, either when left in that position or when driven home again by a tap of the spike-maul.

Another cause is local rot, or so-called "cutting," under the outer base of the rail. Old steel rails in yards, where the condition of the ties is of less importance, will often be found to have bedded themselves deeply into an otherwise tolerably sound tie, and to be canted over to a very considerable angle.

It is probable that true "spreading of track" is in reality a much rarer thing than would appear from the face of accident returns. It furnishes a very convenient excuse for accidents in fact due to fast running, or defective trucks or irregular application of brakes, and the spread rails are always there to show that they *have* spread; but it is too often, we cannot doubt, more an effect than a cause of the accident. When wheels are once off the track they are almost sure to "spread the track" almost immediately; sometimes all over the right of way.

Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

Beech Creek, Clearfield & Southwestern.—A branch is completed from Clearfield Junction, Pa., to Clearfield, 4 miles.

Cadillac & Northeastern.—Completed from Cadillac, Mich., east by north to Muskrat Lake, 10 miles.

Evansville, Washington & Brazil.—Track laid from Washington, Ind., northward to Plainville, 12 miles.

Minneapolis, Sault Ste. Marie & Atlantic.—Extended from Bruce, Wis., east to the Flambeau River, 9 miles.

St. Louis, Fort Scott & Wichita.—Extended from Anthony, Kan., west to stock yards, 2 miles.

Silver Springs, Ocala & Gulf.—Track laid from Silver Springs, Fla., west to Ocala, 6 miles.

This is a total of 43 miles on 6 roads, making 1,515 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles.		Miles.
1885	1,515	1878	1,123
1884	2,243	1877	1,108
1883	3,337	1876	1,388
1882	6,544	1875	675
1881	3,719	1874	984
1880	2,950	1873	2,126
1879	1,599	1872	4,264

This statement covers *main track only*, second or other additional tracks and sidings not being included.

NEW PUBLICATIONS.

The American Engineering Register. Lewis M. Haupt, A. M., C. E., Editor. Engineering News Publishing Co., New York. Office, American Engineering Register, Philadelphia.

To compile a directory of several thousand men who are vagabonds by profession is something of an undertaking. This attempt, however, Professor Haupt has made, and with really surprising success. We cannot but feel astonished that a first attempt of the kind, carried out in the main by one man's labor, should have succeeded in covering the field so well.

The first part of the work consists of the "Alphabetical List" of 170 pages, which, by a rude count, contains some 14,500 names and addresses of engineers, architects and surveyors. They are printed according to the latest improvement for directories, with ditto marks for repeated surnames and with gothic reference letters, **Ab, Ac, Ad,** etc., interspersed at the proper points.

The remainder of the thick volume of 411 pages is occupied by classified lists of the same names, divided up under the heads of Architects, Army, Bridge, Civil and Consulting engineers, Contractors, Draftsmen, Electrical, Gas and Geodetic engineers, Geologists, Hydraulic engineers, Hydrographers, Landscape and Topographical engineers, Navy engineer corps, Mechanical, Mining and Sanitary engineers, and Surveyors. In addition to this, apparently by an afterthought, there is an addendum of 97 pages of railroads and their officials; making the whole book quite a large, as well as very neat and well printed, volume.

Considering that, according to the census of 1880, there are only 8,261 civil engineers, no mechanical engineers nor surveyors (those heads being omitted), 3,375 architects and 1,206 railroad builders and contractors, it must be admitted that this is very successful gleaning. More cannot be reasonably asked than to get even as many names, with full address and official position or specialty, as the census discovered to exist in the whole United States. Professor Haupt has much more than done this for civil engineers, although his lists of architects and contractors fall far short of the census limits. The explanation is, of course, that the census only includes those as engineers who are not elsewhere included as officers of corporations or of manufacturing concerns, although where the large class of surveyors are in the census we cannot imagine, unless among the 227,710 "teachers and scientific persons." The census classification, in fact, is awkward and antiquated in many ways, no "editors," for example, appearing in it, although 1,912 "hunters, trappers, guides and scouts" and the 1,131 "authors and literary persons" duly appear. Its imperfections in respect to the engineering classes are especially noticeable.

On the other hand, Professor Haupt has properly and wisely made the rules for inclusion in his lists very liberal. In them will be found all those who (1) belong to any organized body or society, (2) are graduates of any engineering school, (3) whose cards appear in the advertising columns of any engineering journals, (4) who are classed as engineers on the staff of any railroad, gas-works or water-works, accessible lists of which exist, or (5) are in any department of the government or (probably less completely) state and city service; together with (6) "all other persons" whose address could be obtained in answer to circulars. Under one or the other of these heads every important name is likely to be included, and among many names which we have looked up we have found but very few, and those very pardonable, omissions. Omissions and errors, no doubt, there are in plenty, for probably a large percentage of those included have changed their addresses since the information on which this book is based was gathered; but this is unavoidable, and in spite of, as well as on account of it, the book will probably be generally regarded as a highly useful publication.

TRADE CATALOGUES.

Revised Illustrated Catalogue of Knowles Steam Pump Works. New York.

This neat pamphlet contains little that is especially new in the classes of pumps used for railroad service, but we should judge the quick steaming fire apparatus, by which steam can be gotten up in six minutes by one man and from one to ten streams applied to any point of a large works, would be of interest to all railroad men responsible for the protection of large shops. In addition, the regular lines of pumps are shown, which are now well known. Typographically the book is very neat, in fact, unexceptionable.

Results of Government Railroad Ownership.

[From Railroad Transportation, its History and its Laws, by Arthur T. Hadley, a volume to be published about the end of 1885, by Geo. P. Putnam's Sons.]

II.

Such is the system of rates which is on the whole most characteristic of state railroad management. It was adopted on two quite distinct grounds, one theoretical, the other practical. As a matter of theory, it was thought that rates ought to be based upon differences in cost of service—or rather, to put it more accurately, that differences in rates ought to be based upon differences in cost of service. As a matter of practice, it was thought that it would result in good both to the railroads and the public. We thus have to consider two distinct questions at the same time: first, how far the theory was actually carried out, and, second, whether the results were good or bad.

First, then, were differences in rates actually based upon differences in cost of service?

As regards classification—differences in charge on different kinds of freight—the theory was never completely carried out. Even in Alsace itself, an exception had to be made in the matter of coal—an exception which by special provision was sometimes extended to other cheap and necessary articles. A system of rates by which each article pays its share of the fixed charges would virtually prohibit the movement of coal. Yet the moment you abandon this principle you abandon the system of basing rates upon cost of service.

As regards local discriminations, they carried the principle out systematically. Yet even in Germany, where the results were most complete, they overdid the matter in such a way as to prevent the theory from being strictly followed. The theory is this: Each consignment ought to pay a fixed charge, independent of distance, to cover terminal expenses *plus* a rate per mile to pay for movement expenses. But if they carried this theory out, it would injure both the very short distance traffic, and the very long distance traffic. For the long-distance traffic the mileage rate heaps up so high as to prevent the sale of goods in distant markets. For the short-distance traffic the terminal charge amounts to so much as to make men and goods either go by horse-power or not go at all. It prevents the development of a vast and in some respects easily handled traffic.

The authorities felt the force of these last points, and in order not to check local business, they made their terminal charges very low—lower than the theory demanded. But, according to the principle of tolls, if they made one element of the charge too low they had to make up elsewhere. This led to a still further increase of the mileage rates, and made matters all the worse for the long-distance traffic.

Belgium and Austria felt this difficulty, and adopted the sliding scale of charges. This was probably good policy, but it was an abandonment of the principle on which they pretended to act. It made the middle-distance traffic pay relatively more profit than the long or short-distance. In other words, they based rates on what the traffic would bear, and then adopted an elaborate system of pulling wool over their own eyes, in order that the schedules might look as though they were based upon cost of service.

Prussia did not adopt the sliding scale as a principle. But down to the year 1880 she did virtually the same thing in another way. The long-distance traffic was favored by an elaborate system of special rates for export, import or transit trade. They were not, in general, contracts with individual shippers; but each line of goods had a special tariff of its own, applied equally to all who engaged in international business. A decided change was made in 1879-80. Bismarck at that time took up a more distinctly protective tariff policy. To allow these favors to foreign trade was virtually to counteract all such attempts at protection; for in many cases the increased import duties were followed by a lowering of railroad charges which counterbalanced it. To prevent this, the policy of special rates for international trade was abandoned.

Austria was the nation which suffered most directly from this change, because so much of her export trade went into Prussia or through Prussia to other countries. This trade could not bear the increase of rates. Some of the traffic instead of going northward *via* Prussia went southward *via* Trieste and the Mediterranean. But there was a more direct way of evading the trouble. The river Elbe runs from the Austrian frontier right through the heart of Prussia to Hamburg. By putting steamers on the Elbe, Austria obtained a through rail-and-water route independent of Prussian rail connections. By making use of the Bavarian railroads (which were not under the control of Prussia) Austria was also enabled to carry her products to the Rhine, and thus ship them to Holland, Belgium or England. The Prussian roads felt the loss of their through traffic. The government withdrew from its extreme position, and attempted a partial compromise with Austria. This was rejected. They then tried retaliation. They made connections with Danube steamers, to prevent the Austrian roads from getting Prussian traffic. And thus we had the curious spectacle of a fight of Austrian railroads and Prussian waterways on the one hand, against Prussian railroads and Austrian waterways on the other. Each party succeeded in causing the other a good deal of inconvenience; but neither party was able to make foreign traffic pay domestic rates. The question has but just come to a settlement.

It is clear that even with the whole power of the European governments, the laws of trade have proved too strong for any arbitrary attempt at railroad regulation to succeed. The effort to base rates upon cost of service has only resulted in a compromise. It must be confessed, on the other hand, that important results have been achieved. They have done away with the most dangerous forms of special contract and secret discrimination. The worst abuses under which we suffer in America have been avoided, at the sacrifice, however, of many advantages which we enjoy.

The real principle on which the Russian system of railroad charges is based was clearly stated by the government in 1879. 1. The tariff should be clear. 2. It should be equable. 3. It should not produce bad indirect effects. 4. It should not give opportunities for official corruption and corrupt favors. This is not basing rates upon cost of service (unless by a somewhat strained interpretation of the second heading). It bases them upon intelligible practical grounds, of which any railroad man will see the force, even though he may not deem it possible to apply them to the tariff of his own road.

This effect upon rates can only be secured at the sacrifice of everything like railroad competition, and of any good which railroad competition may bring in the way of rapid development or of efficient use.

The governments of Central Europe have given up trying to secure obedience to these principles by simple prohibitory laws, such as are occasionally proposed in Congress. They have a hundred times more police power than we have, but they do not undertake to do this. To secure obedience to this system, they must take away the temptation to violate it. This can only be done by a system of pooling contracts. These are accordingly legalized and enforced. They are carried on to an extent undreamed of in America. They have both traffic pools and money pools. There are pools between state roads and private roads, between railroads and water routes. It is regarded as a perfectly legal thing that one road should pay another a stated sum of money in consideration of the fact that the latter abstains from competing for the through traffic of the former.

These principles applied by these means tend to keep rates up. The roads do not lower the local rates to any extent, but rather raise the through ones. They level up instead of leveling down. They are not occupied with the question how to lower rates, but how to keep the right proportion be-

tween existing rates. In trying to decide that matter fairly, they are tempted to put everything high enough to leave themselves elbow-room. In their anxiety to decide what is a fair rate in proportion to other rates, under existing circumstances, they neglect the question, How can we change circumstances so as to make lower rates?

This is an evil inherent in the very nature of tolls. There was never a more mistaken idea than the idea that rates would be reduced if they were based upon cost of service. The principle keeps rates up. If it is strictly applied, it makes it necessary that each item of business should pay its share of the fixed charges. A great deal of business which would pay much less than its share of the fixed charges (though still giving a slight profit above train and station expenses) is thus lost. This is bad for the railroads, bad for the shipper, and bad for the prospect of low average rates. It makes the business of the roads so much smaller that the share of fixed charges which each piece of business has to pay (under this system) becomes higher, while the profit does not increase, and the inducement to new construction is lessened. These things are not mere theory, but are matters of history. The great reductions of rates, whether in the United States, Belgium or elsewhere, have taken place under the stimulus of competition, even if it was only temporary. They have been made at the very periods when the principle of basing rates upon cost of service was most systematically violated. It is the countries which have passed through such periods that enjoy the lowest rates. The average rates on all shipments in Ohio to-day are probably lower than the German rates for *coal* for the same average distance. And finally, the refusal to allow railroads to be run for profits prevents the construction of new roads when they are really needed. If a road with its hands free could just make a profit, a road forced to base rates upon cost of service, and thus check the development of certain lines of trade, could not do so. It would thus have to go unbuilt, or else receive a subsidy—a dangerous policy. The effort to base rates on cost of service goes hand in hand with the policy of subsidies. The money ultimately comes, or is supposed to come, out of the pockets of local tax-payers. Nobody else is enough interested to have the road built. If they are charged what the traffic will bear, they pay it to the railroad direct. If they furnish a subsidy, they pay it *via* the public treasury. Neither way is very satisfactory, but in the United States at any rate we have found the second the worse evil of the two.

To offset these arguments it is urged that the rolling stock is more fully utilized under the Prussian system, and that there is less waste of capital, because the new construction is intelligently adapted to the needs of the country; and that both of these causes greatly reduce the cost of railroad service. Neither point is fully made out. The state roads undoubtedly manage to use a large percentage of available car space. It is by no means clear that they secure the same economy in time. They load them quite fully, but they seem to keep them idle a long time to do it.* In the second point, concerning new construction, there is much more force; a force which is nevertheless weakened by two considerations: First, the state is of necessity slow in appreciating the business importance (as distinct from the political importance) of new lines, and thus makes financial mistakes. Second, it is rare that the state does not have to pay more for a given piece of work than would be paid by a well-managed private company.

This brings us to the political dangers of the state railroad system. These have been most forcibly felt in Italy, as detailed in the report of the Investigating Commission.† If we may believe M. le Hardy de Beaulieu, an excellent authority, the same troubles are making themselves felt in Belgium. In Prussia there is little or no complaint. This is chiefly due to the superb organization of the Prussian civil service. But the possible dangers—dangers which would be realized under a less stable government than that of Prussia—may be inferred from the number of officials employed in railroad service. Not counting mere laborers, incidentally employed, the number of Prussian railroad officials exceeds one hundred thousand. There is little need of dwelling upon the evils which would arise from this cause, were such a system applied in the United States.

Foreign Technical Notes.

For setting tires gas heating is very popular on account of the cleanness and exactitude of the work, and also on account of its cheapness where the price of gas is low.

Papier maché has met with much favor in Europe as an interior lining for passenger cars, on account of its non-conducting qualities, and has been used to some extent exteriorly.

For our automatic brake cords a device might be supplied with advantage for localizing interference with them which has been applied to train-signal devices in Europe; that is, the attachment of the cord to a staple with a loop of light twine sealed with an ordinary car seal. This does not prevent immediate use, but identifies the car where the cord has been tampered with. It is, of course, much more effective in European stock, where the very compartment becomes identified, than with ours.

Preserved timber is little used for construction, but the Lubeck-Buchen road reports that the use of chloride of zinc has doubled the life of its cattle and flat-car floors. Most roads season their timber, but very few do so artificially.

For workshop floors the following materials are favorites in Germany: for engine and car repair shops and for machine shops, wooden block pavement; for machine shops where heavy loads are carried, block pavement on a solid foundation; for standing room around benches and planers, plank floor; for smith shops, blast furnace clinker; for paint shops, concrete.

Steam heating in Europe is generally done with larger pipes than with us, which are more in the nature of drums. The American practice of inch pipe works out more simply in application, and takes up less room for equivalent heating surface, though it involves more parts and apparently greater expense in preparation.

Electric light is being applied for workshops quite extensively, and the handsome Siemens regenerative gas burners have also been applied a good deal for work shops and street lighting, giving a light almost as effective and more steady than that of arc lamps.

By far the most popular form of transfer-table in Europe is an underhung table, for which the traversing rails are on the same level with the tracks which approach the table pit or ground. This allows the tracks to run unbroken across the pit, except by the slots for transfer-table wheel flanges. The rails for carrying the cars to be transferred are just above the other rail level, and the car runs up short wedge-shaped extensions of the table rails in getting on to them. These extensions are pivoted to the ends of the table rails, and are held up by springs, when not pressed down by a car-wheel, in such a manner as to clear the tracks across the pit.

Electricity has been used in German shops for working portable drills, etc., and it would seem to have a good field here for development, the conductor being less clumsy on the one hand than the flexible steam-pipes or wire ropes which have been used and the driving dynamo more compact and less obtrusive in every way than the usual portable steam apparatus. In the experiments hitherto made, however, one railroad abandoned the attempt on account of the loss of power in transmission, and the other, while attaining satisfactory results as to convenience, paid no special attention to the consumption of power.

Experiments by Jules Michel, Chief Engineer Paris Lyons & Mediterranean Railroad, published in the *Revue Générale des Chemins de Fer* last year, showed a loss of one-third of the moment of resistance for a wear of 15 *mm.* (0.6 in.) on rails 60 *mm.* (2.4 in.) wide on top, 100 *mm.* (4 in.) wide on base, 12 *mm.* (0.48 in.) thickness of stem, 128.6 *mm.* (5⅛ in.) high and weighing 34.2 kilogrammes (68½ lbs.) per metre. Thus, these rails, upon being worn down ⅛ inch had their carrying capacity for the span of 3 ft. between the edges of ties decreased from 97 tons to 64 tons. Rails which had been 6 and 10 years in the track showed no molecular change, having the same coefficient of elasticity, elastic limit, and breaking strain as new rails.

A parallel case is furnished by the tests on one span of the Chicago, Burlington & Quincy bridge over the Mississippi at Burlington, which was taken down to be tested after 14 years use, and showed no molecular change whatever.

The loss of rails by rusting and grinding on the sleepers seems to be much more considerable, according to Mr. Michel, than is generally supposed. He says that in the tunnel of Vienne, 1,100 metres (3,610 ft.) long, a loss of nearly 2 per cent. in weight of rails per year took place, which was reduced to less than 1 per cent. by painting the rails with tar and renewing the ballast so as to get rid of the fine grit. A 76½-lb. rail that had been in the track 13 years and lost ¼ in. from the head had been gouged out ⅛ in. on the under side of the head and $\frac{3}{16}$ in. on the upper side of base by a splice offering too short a bearing surface. The under surface of this rail had been worn off $\frac{1}{16}$ in. by grinding on the ties. He recommends splices 27½ to 29 in. long.

Mr. Michel uses spikes, chair-plates and splices all of steel. He recommends for prolongation of the life of rails:

1. Use of hard steel for rails and all their fittings.
2. Increase of contact surface of rails and fastenings.
3. Use of very porous ballast.
4. Occasional alteration of the bedding of the ties and of the position of the fastenings.
5. Tarring the rails at places where they are particularly exposed to vapors and sulphurous gases.

It is difficult so see what advantage can be had from the fourth recommendation, and as to the first, it is of course a disputed point how far the advantage of loss of wear balances the greater liability to fracture, particularly in our climate.

German experience has been quite extensive in the giving of premiums for work, and in doing it by the piece, and this seems worthy of mention in some detail.

The Karl Ludwig Railroad in Galicia gives prizes to enginemen, firemen and round-house employés as follows: The premiums are given for a certain length of run in excess of a minimum without repairs, provided the cost of repairs afterward does not exceed a certain sum, as follows:

Class of Locomotive.	Express.	Passenger.	Freight.
Length of run, miles:			
Over	28,000	23,600	20,000
and under	34,200	33,000	25,000
Premium for 1,000 *km.* (= 621 miles) over minimum	$1.40	$1.40	$1.40
Maximum cost of repairs to entitle to premium	4.00	5.60	7.20

If more is got out of the engines than the higher figure named in each class, allowance of $1.80 per 1,000 kilometres (621 miles) is made for such excess. Of these premiums the engineman gets 45 per cent., the fireman 15 per cent., and the round-house force 40 per cent.

The result has been a better condition of engines and reduced cost of maintenance as well. On the Austro-Hungarian State Railroad the system is much the same, but more detailed. The premiums, after deduction of charges for current repair material and fines for service misdemeanors of any sort, are handed to the enginemen, or, if there are several, to each of them in proportion to his running, provided he has made over 4,000 kilometres (2,500 miles) with the machine. Out of the premium the engineman gives 10 per cent. to the fireman and 10 per cent. to the round-house foreman, or foremen if there are two. On the Liebenburger Railroad further details of the divisions are given. Thus repairs carried out by the round-house force, or even by machine shop men, are not counted as limiting the running period unless they exceed $24 in cost; but if they amount to more than that the engine is counted as having finished its service period when the repairs began.

The running account is made up as follows: Every kilometre run in train service between stations or in yards counts full. Engine kilometres without fire count ⅔ of the distance run. Every hour of delay to a train counts 3.3 miles, and every hour under steam between trains counts ¼ mile.

Trial trips after repairs are not paid for. Distances in a total running account of less than 31 miles are disregarded. Those over 31 miles count as 62.

The premium lists are prepared by the roundhouse foremen in consultation with the workshop authorities, and are audited by the general management.

Some roads count by the number of driving-wheel turns made instead of by the distance traveled, in which case the engines are not separated into classes, and the repair shop men receive on some roads premiums for the length of run after leaving their hands.

The Prussian management of the Right Bank of Rhine Railroad gives premiums for the discovery of defects to any employé who is not specially charged with the detection of such, provided that notice is given promptly enough to avoid accident or further damage.

The Saxon roads extend these premiums to inspectors also. Their scale of premiums is as follows:

Breaks in draw-bars	10 cents.
Breaks in draw-bar attachments	5 "
Broken leaves in springs	5 "
Damaged pedestal jaw	12 "
Broken brake apparatus	5 "
Spring tire	37 "
Cracked or any way defective tire	24 "
Loose tire	24 "
Loose wheel	37 "
Broken spoke	24 "
Break in axle	37 "

Premiums are not given if, in the opinion of the proper workshop foreman, the damage was insignificant, or if its repair could have been left perfectly well until the next inspection. If a car is sent to the shop under such circumstances the official sending it must pay a fine of half the amount of the premium claimed.

Premiums are also given in the Saxon shops for good workmanship and discovery of defects which require unusual watchfulness to detect.

Piece-work is paid as per following scale of prices, and has resulted in better and quicker work, as the price is not paid if the engine comes to the shop again inside of six weeks, unless it is clearly not the fault of imperfect repairs:

For interior boiler inspection	$1.82
For exterior boiler inspection	1 46
For tender boiler inspection	0.73
For taking out one or more, but not all the axles	0.48
For removing all the axles	1.46

THE SCRAP HEAP.

Passes.

Man—I am going to San Francisco, and I thought I would see if I could get a pass as far as Chicago, as I— Passenger agent (sharply)—No passes given out by this company, sir. You'll have to pay your fare. "But, sir, I am—" "Yes, I know. You're poor, and must get to 'Frisco to get a job. Makes no difference; this road isn't run for the benefit of poor men." "You are mistaken, sir. I am Peter Golddust, the owner of the Great Gun Mine. I'm able to buy your road, but I—" "Indeed! Able to pay your fare! Why didn't you say so before! Here are two passes, my dear sir."—*Philadelphia Call.*

Fast Time.

A special train, consisting of a locomotive and two private cars, belonging to Mr. W. H. Vanderbilt, made the run of 179 miles over the Maine Central road from Mt. Desert Ferry to Portland in 4 hours 13 minutes, an average of 42.45 miles an hour. From Mt. Desert Ferry to Bangor, 42¼ miles, the time was 1 hour 28 minutes, or only 28.98 miles an hour, but the run from Bangor to Waterville, 55 miles, was made in 1 hour 9 minutes, or 47.83 miles an hour, and from Waterville to Portland, 81½ miles, in 1 hour 36 minutes, or 50.94 miles an hour. This, it is said, is the best time ever made over the Maine Central.

At a Montana Station.

Three loaferish cowboys had sauntered up to the depot of a little town in Montana, closely eyeing a neatly dressed jewelry drummer who was reading a newspaper. Presently one of them—a big six-footer—left the group and began to saunter carelessly about the platform with his head in the air inspecting the posters on the building and the cornice. When he got round where the traveling man stood, he raised his big brogan and planted it firmly on the jewelry man's foot. No apology was made. The traveling man merely looked up, drew his foot back a moment, then placed it back where it was. The cowboy passed back to the other two. They all chuckled and joined in a low-toned conversation.

Soon the cowboy started out again on a similar round, gaping at the roof. When he reached the traveling man he tried to bring down his coarse boot on the extended foot. The traveling man jerked his foot back suddenly, and the brogan

* In Belgium the complaints on this point are very serious. Cars lie waiting for a load at one point, and are not to be had at other points when they are wanted.

† *Railroad Gazette*, 1884, p. 640.

came down with a thump on the platform. Another conference and chuckling followed. Finally the cowboy set out on the third round. Just as he was about to raise his foot to plant it on the traveling man, the latter looked up quickly and said:

"See here; there is my foot, and it's going to stay there. You step on it if you want to, but I want to tell you that before you can get off of it I will kill you."

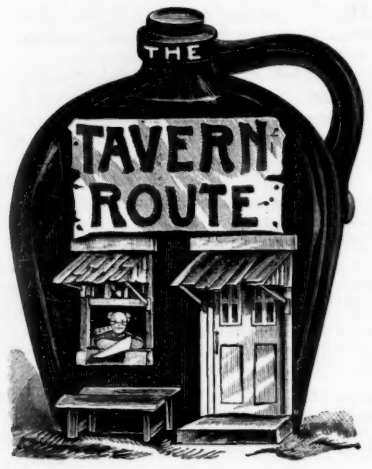
Such a volley staggered the cowboy. He looked at the foot and then at the small possessor, and finally moved off without stepping on it. Another consultation followed.

The traveling man calmly read his paper a few minutes, and then took from his satchel three apples. He looked at them a moment, and suddenly threw them a few feet into the air, quickly drew a revolver, and fired three shots, splitting each apple into a dozen pieces before it reached the ground. He replaced the cartridges in the empty chambers of the revolver, and returned it to his pocket.

The cowboys witnessed the act without saying a word, and soon, completely cowed, turned and left the depot.—*Milwaukee Sentinel.*

An Attractive Route.

The "Jug Tavern Route"—consisting of the Gainesville, Jefferson & Southern road, which connects a prosperous region in North Georgia with the Georgia Railroad at Social Circle and the Richmond & Danville at Gainesville—issues a very ingenious and enticing poster, on which, as shown in the engraving, is depicted a portly jug, very suggestive of old-time Georgia hospitality and of good whisky, which may—or may not—have paid a revenue tax. Certainly it carries us back to that liberal friendliness and ample hospitality which scorns all such modern improvements and limitations as bot-



tles and glasses and will be satisfied with nothing less than a jug, and a good big one at that.

The people of Jug Tavern, the town from which the route has taken its name, lately, by the way, very sensibly refused to change the old and suggestive name of their town to some modern and unmeaning title which a few of their number thought would sound better. Jug Tavern the name had always been, and Jug Tavern it will remain.

The "Jug Tavern Route" deserves prosperity, and we hope that its jug may always be well filled.

Color Blind in One Eye.

Examiner—"What is the color of this flag?"

Engineer—"Green, sir."

"Right. Now close your left eye. What is the color of *this* flag?"

"Green, sir. Dark green."

"Just so. Shut your right eye. What flag am I waving now?"

"A black one, sir."

"Nonsense. It's bright red. And *this* flag?"

"Black, sir."

"Pshaw! It is white. Your left eye seems a little off."

"Well, may be it is. It is a glass eye, sir."—*Philadelphia Call.*

Train Wrecking by Dynamite.

A dispatch from Denver, Col., Aug. 23, says: "Of the many attempts made within the past two months to wreck trains on the Denver & Rio Grande Railway, probably the most devilish of any was discovered last evening in time to prevent what might have proved a terrible loss of life. Owing to the several explosions under trains, heretofore mentioned, and the terrible effect upon the locomotives which the dynamite has had, a very close watch of the railroad tracks in this city has been kept, a patrol being maintained constantly. The Salt Lake express was due at 9:10 o'clock, and the Leadville express had left at 8:30. A watchman patrolling the track in the meantime discovered near the limits of the city, about the place where the locomotives have already been blown up, a large quantity of dynamite upon the track, and so arranged that it could not avoid being exploded under the locomotive of the incoming express. The dynamite was taken up carefully and filled the watchman's hat. The amount was much larger than could have been used in any of the other explosives, and would undoubtedly have wrecked the train, which was very fast at this point, there being a steep down grade. The attempt grows out of the strike in the Denver & Rio Grande shops."

TECHNICAL.

Locomotive Building.

The Brooks Locomotive Works in Dunkirk, N. Y., have, it is said, secured two contracts, each for 5 heavy freight locomotives.

It is understood that the Chicago, Burlington & Quincy Co. is about to place an order for 32 new locomotives, to be used on its new St. Paul line. At latest dates the contract had not yet been awarded. This order will probably be followed by another from the same company.

The Car Shops.

The Michigan Car Co. in Detroit, Mich., is building 100 refrigerator cars for the Fowler packing house at Kansas City.

The Missouri Car & Foundry Co. in St. Louis has some work on hand. The car shops are not fully employed, however, though the foundry is more busy.

The Missouri Pacific Railway Co. recently invited bids for 600 freight cars, but the contracts have not yet been awarded.

The Pullman car shops, at Pullman, Ill., have lately completed three very handsome buffet sleeping cars and two buffet parlor cars, which have been put on the Pullman lines of the New York, Lake Erie & Western road.

Bridge Notes.

The Phœnix Bridge Co. in Phœnixville, Pa., has taken a contract for a highway bridge in Cumberland County, Pa., over Yellow Breeches Creek.

The contract for an iron bridge over Mill Creek and the Philadelphia & Reading tracks on the Pennsylvania Schuylkill Valley road extension, has been awarded to Cofrode & Gaylor, of the Philadelphia Bridge Works, at Pottstown. The bridge will be 600 ft. long over all.

Iron and Steel.

Vulcan Furnace at Newberry, Mich., will go into blast about Sept. 1, by which date it will have 50 kilns built and ready to do service supplying the furnace with fuel. The furnace when in operation will give employment to a force of 200 men, including the choppers engaged in getting out wood for the kilns.—*Marquette (Mich.) Mining Journal.*

The Ohio Iron Co., has put its furnace at Zanesville, O., out of blast for the present.

Mary Furnace at Lowellville, O., has gone out of blast for repairs. It is owned by the Ohio Iron & Steel Co., and will blow in again as soon as the repairs are finished.

Greenwood Furnace at Greenwood, N. Y., owned by the Parrott Iron Co., has gone out of blast.

A rolling-mill is to be built on the old Union Forge property near Lebanon, Pa., by a company recently organized with $100,000 capital.

The Lookout Iron Co., a new concern, has bought the Lookout Rolling Mill in Chattanooga, Tenn., and will put it in good order, in preparation for starting up.

Manufacturing and Business.

The Judkins railroad train signal is now in use on the trains on the Concord & Portsmouth Branch of the Concord Railroad. The same signal is to be applied to several trains on the Boston & Lowell road.

The St. Paul & Northern Pacific Co. (the Northern Pacific's leased line to St. Paul) is now, we are informed, buying a large number of machine tools for the new and extensive shops at Bishop, between St. Paul and Minneapolis. The shops are large, and are to be provided with the best tools

The Rail Market.

Steel Rails.—Quotations are higher as a result of the Long Branch meeting, nominal prices being $28@$28.50 per ton at mill for ordinary sections, and $30@$32 for light rails. No large orders are reported, and it is still a question whether makers will adhere to the increased prices when work is scarce or a specially desirable order offers.

Rail Fastenings.—Quotations continue nominal at 1.90 cents per pound for spikes in Pittsburgh, 2.40@2.85 for track bolts, and 1.60@1.70 for splice-bars. The market continues dull.

Old Rails.—The market for old iron rails is variable, but more inquiry is reported. Quotations are $16.50@$18 per ton at tide-water. Old steel rails are quoted at $16.50@$17.50 per ton in Pittsburgh, with light supply.

Steel Railroad Ties.

The Boston *Herald* of Aug. 22 says: "The International Tie Co., of New York, has secured a number of patents for steel ties. By invitation of officials of the company, a number of railroad men and capitalists went out to the vicinity of the Somerville know-nothing crossing yesterday afternoon and inspected a section of track on the Boston & Maine Railroad where some of the new ties were in use. About 100 ft. of the main outward track had been equipped with the ties, and the effect of running heavy trains over them was shown. The new tie is made of two plates of Bessemer steel, put together somewhat in the shape of a two-em brace (~-). The upper flange is cut away to admit the rails, which are fastened down by clamps, held in place by bolts through the flange. The flange itself is formed of the two edges of the plates, which are fastened together by the above mentioned bolts and by rivets. The side and ends of the plate have flanges turned down so as to enter the road-bed, and thus form an immovable base and an elastic cushion for the rails. The upper flange, it will be noted, prevents the rails from spreading, as they lie between two walls of steel, 2 in. high and ½ in. thick. The ties are from 12 to 15 in. wide, and, of course, can be made any desired length. The heavy engines and passenger trains that passed over the rails yesterday while the party was inspecting the ties showed very satisfactory results, and, if all the claims of the patentees are substantiated by time, it is evident that the company has a good thing, and that the railroads can supply themselves with an excellent substitute for wooden ties."

A Fine Car Model.

There is now on exhibition in the window of the Boston & Lowell passenger agency, No. 218 Washington street, a remarkably fine model of a passenger car. It sits on a little railroad track, is lettered "Boston & Lowell Railroad," and bears the name "Beulah." It is a perfect copy in every particular of a large railway car, even the seats being upholstered with red plush, and made to turn over. The trucks, brakes, platforms, and even the little doors, are perfect in every detail. The purpose of the model is to show the application of the Ober ventilating apparatus. This consists of a large tank placed beneath the centre of the car. It is filled with water, and a large fan revolving over it sends the cool air through diverging channels along the sides of the car and between its outer and inner walls. Beside each seat and between the windows is a small opening through which the cool air is admitted. Small steel doors are adjusted to it, which may be opened or closed to suit the passenger. Openings in the roof of the car permit the foul air to escape. The model as it stands cost about $450. It attracts general attention from those passing by, and is much admired by all.—*Boston Traveler.*

Coke as Locomotive Fuel.

Two locomotives on the New York, Lake Erie & Western road are now being run experimentally with coke, with a view to testing that fuel for use on passenger trains. The two engines in question are at present running on one of the express trains between Jersey City and Port Jervis, on the Eastern Division.

Interlocking Switch and Signal Connection.

Mr. F. P. Abercrombie, Chief Engineer of the West Jersey road, has invented an interlocking switch and signal connection, a patent for which has been applied for. The invention is thus described: "It has a cast iron base with upright curved sides, between which an iron rod with a guiding pin passes through the centre of the rod, which works on the two curved faces, and two connecting rods for switch and signal, working parallel to and at the base of the sides. In opening the switch the first half of the lever movement sets the signal at danger, and the guiding pin, striking the curved face on the signal rod side, is thrown off its connection therewith and into connection with the switch rod, the second half of the lever movement opening the switch. In closing the switch, the first half of the return movement of the lever closes the switch, and the guiding pin, striking the curved surface on the switch rod side, is thrown off its connection therewith and into connection with the signal rod, and the second half of the lever movement sets the signal at safety, so that in opening the switch the danger signal must be set before the switch is moved from its safety position and remain there until after the switch has been opened and closed. This makes it impossible for an engineer to run into an open switch unless he should disregard the danger signal. It has a purely mechanical motion, with no liability to get out of order, and the motion is positive, as it consists of but three pieces, the base with its curved sides, the centre rod and the guiding pin. The double motion is conveyed to the lever by the curved sides, which act reciprocally, thus doing with one lever what has heretofore required two to successfully accomplish. A practical test will be made of the invention at an early day."

The Centre Support Car Truck.

In the annual report of the Little Rock & Fort Smith Co., a summary of which we recently published, it was stated that a number of the freight cars had been rebuilt so as to double their capacity. We are now informed that this was done by putting under them Finlay's centre support truck.

The Pennsylvania Co. has recently put this centre support truck under a number of its cars to test it in actual service. The work was done at the Fort Wayne shops under the direction of Mr. Joseph Wood, Superintendent of Motive Power, and the cars thus far are giving much satisfaction. Applications have also been received by Mr. Finlay from several other roads. The centre support truck can be put under new or old cars at a moderate cost.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Louisville & Nashville, annual meeting, at the office in Louisville, Ky., Oct. 8.

Northern Pacific, annual meeting, at the office in New York, Sept. 17.

Ohio & Mississippi, annual meeting, at the office in Cincinnati, Oct. 8. Transfer books close Sept. 12.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable Sept. 15, to stockholders of record on Aug. 15.

Delaware & Bound Brook (leased to Philadelphia & Reading), 2 per cent., quarterly, payable on demand.

Delaware & Hudson Canal Co., 1½ per cent., quarterly, payable Sept. 10, to stockholders of record on Aug. 29.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be as follows:

The *Master Car-Painters' Association* will hold its annual convention in Toronto, Ont., on Wednesday, Sept. 2.

The *National Association of General Passenger & Ticket Agents* will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.

The *American Institute of Mining Engineers* will hold its fall meeting in Halifax, Nova Scotia, beginning on Wednesday, Sept. 16.

The *Brotherhood of Locomotive Firemen* will hold its annual convention in Philadelphia, on Monday, Sept. 21.

The *General Time Convention* will meet at the Grand Pacific Hotel, in Chicago, on Thursday, Oct. 8.

The *Southern Time Convention* will meet at the National Railway Exchange, No. 46 Bond street, New York, on Wednesday, Oct. 14.

The *Association of American Railroad Superintendents* will hold its semi-annual meeting at No. 46 Bond street, New York, at 10 a. m., on Thursday, Oct. 15.

Southern Association, General Passenger and Ticket Agents.

This Association met in Atlanta, Ga., Aug. 24, with a full attendance. A report was received from a special committee on the liability of railroads for loss of baggage. Accompanying the report were legal opinions of attorneys representing the lines of the association. A resolution was adopted withdrawing from sale emigrant tickets from all points within the jurisdiction of the association to points west of the Mississippi and north of the Ohio. Another resolution was adopted, looking to the appointment of a special committee to fix a penalty for a failure to maintain passenger rates when agreed upon. Officers were elected for the ensuing year, and it was resolved to hold the regular spring meeting in Charleston on the first Wednesday in April next.

ELECTIONS AND APPOINTMENTS.

Boston, Hoosac Tunnel & Western.—At the annual meeting, Aug. 19, the following directors were chosen: Daniel B. Hatch, Wm. H. Hollister, Rudolph Keppler, David J. King, August Kountze, Cyrus J. Lawrence, Henry L. Morrill, Robert B. Minturn, Robert M. Moss, James O. Sheldor, A. T. Smith, Francis Smith, Charles Fay.

Chicago, Wisconsin & Minnesota.—The directors of this new company (controlled by the Wisconsin Central) are: Edward Ferguson, Abbott Lawrence, Joseph B. Oliver, Milwaukee, Wis.; Henry Hawley, John P. Neal, Chicago.

Detroit, Mackinac & Marquette.—Mr. Andrew Watson has been appointed General Superintendent, with office at Marquette, Mich., in place of Mr. Daniel McCool, who has gone to the St. Joseph & Western road.

Green Cove Springs & Midland.—This company (successor to the Green Cove Springs & Melrose) has elected John W. Ashby President; R. B. Canova, Vice-President; J. B. Brown, General Superintendent; A. F. Vogelbach, Secretary; J. C. Greeley, Treasurer. Office at Green Cove Springs, Florida.

Hoosac Tunnel & Saratoga.—At the annual meeting, Aug. 19, the following directors were chosen: J. E. Davis, T. Ernest, Charles B. Foote, Wm. H. Hollister, E. T. Holbrook, A. D. Jones, Charles C. Leary, Henry C. Lawrence, A. S. Lozenbaum, A. T. Smith, Frank R. Smith, S. Newton Smith, McH. Train. The road is leased to the Boston, Hoosac Tunnel & Western.

Northern Pacific.—Mr. J. T. Graham, heretofore Superintendent of the Missouri and the Dakota divisions, will hereafter have charge of the Dakota Division only. Mr. F. Green is appointed Superintendent of the Missouri Division, with office at Mandan, Dak. Mr. Green has been for some time Assistant to Mr. Graham

Pittsburgh, Cincinnati & St. Louis.—The following notice from Mr. Edward B. Wall, Superintendent of Motive Power, is dated Columbus, O., Aug. 21:

"Mr. Robert Curtis is hereby appointed Master Mechanic

of the Pittsburgh, Cincinnati & St. Louis shops at Columbus, Ohio. The Chicago, St. Louis & Pittsburgh Railroad shops at this point will be abandoned. He will report direct to the Superintendent of Motive Power. This appointment to take effect from Aug. 1, 1885."

Silver Springs, Ocala & Gulf.—The officers of this company are: President and General Manager, W. T. Sylvester; Vice-President, Samuel Agnew; Secretary and Chief Engineer, N. R. Gruelle. Office at Ocala, Florida.

Southern Association of General Passenger and Ticket Agents.—At the meeting in Atlanta, Ga., Aug. 24, the following officers were elected for the ensuing year: President, T. M. Emerson, Atlantic Coast Line; Vice-President, G. A. Whitehead, Central, of Georgia; Secretary, C. A. Taylor, Richmond, Fredericksburg & Potomac.

Southern Pacific.—Mr. Wm. Hood has been appointed Chief Engineer of the Southern Pacific Co., Pacific System, to date from Aug. 13.

St. Paul, Minneapolis & Manitoba.—At the annual meeting in St. Paul, Minn., Aug. 21, the following directors were chosen: James J. Hill, St. Paul; D. Willis James, John S. Kennedy, Samuel Thorn, New York; Henry D. Minot, Boston; Donald A. Smith, George Stephen, Montreal. The only new director is Mr. Minot, who succeeds Mr. Marshall Field, of Chicago. The board re-elected James J. Hill, President; John S. Kennedy, Vice-President; Edward Sawyer, Secretary and Treasurer.

Texas & St. Louis.—The following appointments are hereby announced by the Receiver:

"C. T. Stephens, Chief Engineer, having resigned, the duties heretofore performed by him will devolve on Mr. A. E. Buchanan, who has been appointed Superintendent of Maintenance of Way and Bridges, with headquarters at Texarkana.

"Mr. W. H. Adams having resigned, Mr. J. W. Brown is appointed Superintendent of the Missouri & Arkansas Division, with headquarters at Pine Bluff, Ark.

"Division superintendents are hereby relieved from all matters pertaining to bridges and maintenance of way.

"The above-named officers, including the Superintendent of the Texas Division, will report direct to S. W. Fordyce, Receiver.

"Mr. W. J. Lewis has been appointed Master Mechanic of these lines, with headquarters at Tyler, Tex. Division master mechanics will report to him direct."

Wabash, St. Louis & Pacific.—Mr. A. M. Brackenridge is appointed Central Passenger Agent, vice Thos. S. Spear, with office at 1,133 Liberty street, Pittsburgh.

Yadkin.—At a meeting held at Salisbury, N. C., Aug. 19, the following officers were chosen: President, John S. Henderson; Secretary, A. H. Boyden; Treasurer, V. Manney.

PERSONAL.

—Mr. C. F. Stephens has resigned his position as Chief Engineer of the Texas & St. Louis road.

—A report is current that Mr. Henry Monett, General Passenger Agent of the New York, West Shore & Buffalo road, will succeed Mr. D. M. Kendrick in the same office on the New York Central & Hudson River road. Mr. Monett himself contradicts the report emphatically.

—It is reported that Mr. D. M. Kendrick, General Passenger Agent of the New York Central and Hudson River road, will retire from that position on account of ill health. Mr. Kendrick is now traveling in Europe for the benefit of his health.

—Mr. Courtland D. Howell, who died in Philadelphia, Aug. 24, aged 71 years, was born in that city and educated as an engineer. He was for some time employed as assistant in the building of the Pennsylvania Railroad from Harrisburg to Pittsburgh, with the late Strickland Kneass, Edward Miller and other engineers afterward well known in their profession. Later Mr. Howell gave up engineering and entered into business in Philadelphia, where for a number of years he was connected with the Farmers' & Mechanics' National Bank.

—Capt. David S. Babcock, President of the Stonington & Providence Steamship Co. and Vice-President and General Manager of the New York, Providence & Boston Railroad, was knocked down and almost instantly killed by a car at the station in Stonington, Conn., on the evening of Aug. 24. The car was being run into the station by a flying switch, just as he was crossing the track, and he did not see it until too late. Capt. Babcock was 63 years old, and was one of the most widely known and respected of the steamboat men. He was the son of Major Paul Babcock, formerly a prominent citizen of Stonington, and was born near Westerly, R. I. He became a seafaring man in early life, and followed this calling for many years, being engaged in the China and European trade. He finally pushed himself ahead until he became master of a clipper ship, in which he made many fast and famous voyages, and cruised all over the world. In 1860 he assumed charge of the transportation of passengers across the Isthmus of Panama, at the southern terminus of what was known as the Nicaraguan route. When the Providence & Stonington Steamboat route was opened, in 1868, he accepted the Presidency of the company, a position which he held until his death. In 1869 he was made Vice-President of the New York, Providence & Boston Railroad, and for the past few years he had held the position of General Manager of that road. He leaves a widow and 7 children.

—Hon. Daniel J. Morrell, one of the most prominent iron and steel manufacturers of the country, and for years General Manager of the Cambria Iron Works of Wood, Morrell & Co., died at his residence in Johnstown, Pa., Aug. 20. Mr. Morrell was born in Maine in 1821, and when 16 years old went to Philadelphia, where he associated himself with the wholesale dry goods house of Trotter, Morrell & Co., at 32 North Fourth street. In 1842 he embarked in the same business with his brother David. Two years later he became associated with Oliver Martin, dealer in fancy dry goods at No. 28 North Fourth street. In 1855 he assumed the management of the Cambria Iron Works, and made his home at Johnstown. He had a large interest in the works, and they have been kept in continual operation ever since his connection with them. Since the day Mr. Morrell took command, in 1855—through war and panic, good times and bad—the fires have never gone out in the Cambria Iron Works. During all that period, whether profits were large or small, there have been work and wages for the iron workers of Johnstown. Through successive enlargements the works have become the most extensive of their kind in the country, and one of the first in the world. Mr. Morrell's position as head of the Cambria Works gave him great influence in the American Iron & Steel Association, of which he became President in 1879, holding that office until failing health compelled him to retire from it, and from all active business as well, in January last. On the establishment of the Republican party he became attached to that organization, and for many years was one of its most influential and active leaders. In 1866 Mr. Morrell was elected to the National House of Representatives, being re-elected in 1868, but defeated by a small majority in 1870. In Congress he took an active and influential part, especially in all matters relating to industrial questions, and was made chairman of the Committee on Manufactures. The most important feature, however, of his Congressional career was his introduction on the 9th of March, 1870, of a bill to provide for the celebration in Philadelphia of the one-hundredth anniversary of American Independence. This bill became a law mainly through his persistent advocacy. On the organization, in March, 1872, of the Centennial Commission provided for in this act, Mr. Morrell, who had been appointed by Governor Geary one of the commissioners for Pennsylvania, was offered the presidency of that body. This he declined, but he became Chairman of the Executive Committee, a position of greater influence and more onerous duties, in which he contributed largely to the success of the Centennial Exposition. Mr. Morrell attended the Paris Exposition of 1878 as a commissioner from the United States, and presented to the Secretary of State, on his return home, an exhaustive and comprehensive report on the exhibits of iron and steel, and upon the condition of the iron and steel industry of the world up to that time.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Seven months to July 31:				
Cin., W. & Balt.	$960,807	$996.189	D. $35,382	3 6
Des M. & Ft. D..	198 611	179,670	I. 18,941	10.5
Ind., Bloom. & W.	1,258,645	1,250,463	I. 8.182	0.6
N. Y., Sus. & W..	596,811	548,945	I. 47,866	8.7
Northern Cent....	3,00),494	3.097.771	D. 88,277	2.9
Net earnings...	1,154,238	1.119,599	I. 34,639	3.1
Pennsylvania.....	25.004,701	27,322,337	D. 2,317.636	8 5
Net earnings...	7,679,910	9,503,359	D. 1,823.449	19.2
Phila. & Reading.	15,352,053	16.986,454	D. 1,634,451	9.6
Net earnings...	5,857.203	6,723,617	D. 866,414	12.9
South Carolina...	594,130	636,595	D. 42,465	6.7
Six months to June 30:				
Mexican National	$704,048	$710,816	D. $6,768	0.9
Net earnings..	163,491	95,200	I. 68,291	71.9
Rome, Wat. & Og	749,605	733,255	I. 16,350	2.2
South Pacific Co.:				
Atlan. System..	3,993,551	3,559,248	I. 434,303	12.2
Month of June:				
Rome, W. & Og.	$140,810	$143,797	D. $2,987	2.1
South. Pacific Co.:				
Atla ·. System.	602,852	371,196	I. 231.656	62.6
Pacific System.	1,822,414	2,045,075	D. 222,661	10.9
Month of July:				
Cin., W. & Balt..	$117,241	$141.733	D $24,492	17.3
Des M. & Ft. D...	29.324	23,680	I. 5,644	23.8
Ind., Bloom. & W.	167,665	173,188	D. 5,523	3.2
N. Y., Sus. & W..	100.696	97,017	I 3,679	3.8
Northern Cent...	411,722	477.516	D. 65,794	13 8
Net earnings..	111,063	171,256	D. 60,193	35.2
Pennsylvania.....	3,685,105	3,989.085	D. 303,980	7.6
Net earnings...	1,160.049	1.391.1 6	D. 231.067	16.6
Phila. & Reading.	2,641,851	2,767,791	D. 125,940	4.5
Net earnings...	1,138,067	1,216,779	D. 78,712	6.4
So. Carolina.....	61,137	59,255	I. 1.882	3.2
Second week in August:				
Canadian Pacific.	$176,000	$134,000	I. $42,000	31.3
Chi. & East. Ill...	33,937	33,808	I. 129	0.4
Chi., St. P., M. & Omaha.....	97,985	101,744	D. 3,759	3.7
Cin., Ind., St. L. & Chi.	43,430	56.334	D. 12,904	23.0
Illinois Central..	210,700	215,268	D. 14,568	6 8
Iowa lines'.....	25,900	30,160	D. 4,260	14.1
Louis. & Nash...	235,385	253,535	D. 18,150	7.1
St. P. & Duluth.	27,150	29,135	D. 1,985	6 8
Third week in August:				
Chi. & Alton ..	$176 249	$222.174	D. $45.925	20.7
Chi , Mil. & St. P.	397,000	403.510	D. 6,540	1.6
Chi. & Nor'west.	446.000	461,400	D. 15.400	3.3
Cin., Ind., St. L. & Chi.	48,375	56,335	D. 7,960	14.2
Det., Lan. & No.	23 250	25,503	D. 2,253	8 8
Mil., L. S. & W.	31,935	21,010	I. 10,945	52.1
Roch. & Pitts....	26.372	25,413	I. 959	3.8
St. L. & San F...	82,300	91 200	D. 8 900	9.8

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending Aug. 15 are reported as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Anthracite.....	822,551	720.792	I. 1,759	0.2
Eastern bituminous	178,473	181,284	D. 2,811	1 6
Coke.....	51,114	65.766	D. 14,652	22.3

A somewhat better demand for anthracite coal is reported, but the increased sales are not sufficient to prevent the continued accumulation of stocks at tide-water. While all the companies (excepting the Pennsylvania Railroad, which is not a party to the agreement) have so far kept pretty closely to their allotments, much dissatisfaction is reported, and a breaking up of the agreement is not at all impossible.

Pennsylvania Railroad coal tonnage for the week ending Aug. 22 was:

	Coal.	Coke.	Total.	1884.
Line of road....	132.743	46,913	179,656	197,048
From other lines.	87,888	529	88,417	69,291
Total.....	220.631	47.442	268,073	266,339
Year to Aug. 22.	6,857,275	1,632,007	8,489,282	8,444,069

Increase for the week, 1,734 tons, or 0.6 per cent.; increase for the year, 45,213 tons, or 0.5 per cent.

Cumberland coal shipments for the week ending Aug. 22 were 57,557 tons. Total to Aug. 22 this year, 1,711,932; last year, 1,773,436; decrease, 61,504 tons, or 3.5 per cent.

Petroleum.

The production and shipments of the Pennsylvania and New York oil wells for July are given by *Stowell's Petroleum Reporter* as follows, in barrels of 42 gallons:

	1885.	1884	Inc. or Dec.	P. c.
Production.....	1,775,804	2,059.150	D. 283,346	13.8
Shipments.....	1 961,152	1,740,021	I. 221,131	12.7
Stock, July 31.....	35,686,909	38,985,767	D.3.298,858	8.5
Producing wells.....	22,524	21,844	I. 680	3.1

Production was exceeded only in two months of the present year, but was less than in any month of last year or of the four preceding years. Of the total, the Allegheny District in New York furnished 13.0 per cent.; the Bradford District in Pennsylvania 41.2; the Warren District 12.0, and the Lower District 33.8 per cent.

Shipments were less than in May and June, but exceeded those of any other month this year. They continue to be much in excess of production.

Stock was diminished by 185,348 barrels during the month, that being the excess of shipments over production.

In July there were 217 new wells completed, while 37 dry holes, or failures to find oil, are reported. At the close of the month there were 242 new wells in process of drilling, and 147 new rigs were building to drill wells at other points.

The shipments out of the oil regions for the month were as follows:

	Crude.	Refined.	Total.	P c.
New York.....	533,?91	66,798	600,189	30.6
Philadelphia.....	539,091	44,893	583 984	29.8
Baltimore	66,561	53,896	120,457	6.1
Boston.....	17,100	162,390	179,490	9 2
Cleveland.....	241,181	.....	241,181	12 3
Pittsburgh.....	42,193	.....	42,103	2.2
Local points	128,973	64,775	193,748	9.8
Refined at Creek refineries.....	392.752	.....	.....	...
Total.....	1,961,152	392,752	1,961,152	100.0

In this table the refined oil is that refined at Creek refineries; it is reduced to its equivalent in crude, so that the total represents the amount of crude oil shipped to each point named, whether in crude or in refined form.

Cotton.

Cotton movement for the week ending Aug. 21 is reported as follows, in bales:

Interior markets:	1885.	1884.	Inc. or Dec.	P c.
Receipts.....	2,930	2,026	I. 904	44 5
Shipments.....	7,515	4,228	I. 3,287	77 7
Stock, Aug. 21.....	19,241	16,599	I. 2,642	15.9
Seaports:				
Receipts.....	4,402	2.805	I. 1,597	57.0
Exports	16.101	13,360	I. 2,741	20.5
Stock, Aug 21	145,427	144.440	I. 987	0.7

The total movement from plantations for the cotton year (from Sept. 1) to Aug. 21 is estimated at 5,620,150 bales, against 5,650,936 last year, 6,974,219 in 1882-83, and 5,355,674 in 1881-82. The year is now nearly closed, and the few remaining days will add but a few bales to this estimate.

Chicago, St. Louis & Missouri River Association.

At a meeting of the roads in this Association in Chicago, Aug. 24, it was resolved to make all rates from Milwaukee to St. Louis the same as the Chicago rates. This action was taken in consequence of the action of the Chicago, Milwaukee & St. Paul Co., which has been taking freight from Milwaukee to southwestern points by way of Ottumwa and Moberly in connection with the Wabash and the Missouri Pacific roads.

Texas Traffic Association.

At a meeting of the Executive Committee in Galveston, Tex., Aug. 24, it was decided to fix rates on cotton from Dallas at $3.25 per bale to Houston, $3.50 to Galveston and $3.75 to St. Louis or New Orleans. Rates from other points were adjusted on the same basis.

Colorado-Utah Association.

The arbitrators, Messrs. Alexander MacKay, Wm. Duncan and George H. Daniels, have made their award on the division of business among the lines in this Association. The following is the new award compared with the one previously made:

	New.	Old.
Chicago & Alton	12.75	13 00
Burlington.....	29 00	29 00
St. Paul.....	12 00	9.50
Northwestern.....	12.75	13.50
Rock Island.....	14 00	15.00
Missouri Pacific	7.50	8.00
Wabash.....	12.00	12.00
Total	100.00	100.00

This division is to take effect from July 1 last. It is said that several of the roads are dissatisfied, and will ask for a new award.

Western Freight Association.

The arbitrators, Messrs. John C. Gault, Wm. Duncan and George M. Bogue, have decided on the following percentages for the range cattle business in the pool:

Road.	Per cent.
Burlington.....	33.35
St. Paul	16.50
Northwestern.....	28.65
Rock Island.....	16 50
Wabash.....	5.00
Total.....	100 00

These percentages are to apply until Jan. 1, 1886.

In the pool on local business from Omaha, Council Bluffs and Papillon, after deducting 11½ per cent. of the gross earnings for the Missouri Pacific, 5 per cent. for the Chicago, St. Paul, Minneapolis & Omaha, and 5 per cent. for the Kansas City, St. Joseph & Council Bluffs, as per agreement, the remainder is to be divided as follows:

Road.	Per cent
Burlington.....	23.50
St. Paul..	19 50
Northwestern.....	19.50
Rock Island.	19.50
Wabash.....	18.00
Total.....	100 00

These percentages are to continue from May 15, 1885, until Dec. 31, 1886, subject to six months' notice of withdrawal.

Passenger Rates.

At a meeting of passenger agents in New York, Aug. 21, the existing differences were settled, and it was decided to make the rate from New York to Chicago $14 first and $11 second class; to St. Louis $17.50 first and $14.50 second. Rates to other points will be in proportion. The Pennsylvania Railroad was not represented at the meeting, and it is not known what course it will adopt.

A dispatch from St. Louis, Aug. 26, says: "The Wabash gave notice yesterday of its withdrawal from the St. Louis East-bound passenger agreement of July 2. The withdrawal is based on alleged irregularities and cutting on the part of the Bee Line and the Vandalia roads. Tickets to New York are said to have been sold at $17, and the rate is expected to drop to $14."

RAILROAD LAW.

Highway Grade Crossings in New Hampshire.

The Railroad Committee of the New Hampshire Legislature has prepared a bill for the better protection of highway grade crossings over railroads, which will, if passed, put the question largely under the control of the Railroad Commissioners. In this report the Committee states that there are nearly 700 highway grade crossings in the state, and at only 32 of them is there any form of protection against accident.

Right to Compel the Establishment of a Station.

The case of the State on the relation of F. W. Mattoon against the Republican Valley Railroad Co. in the Nebraska Supreme Court, was an application for a writ of *mandamus* to compel the company to build a station and stop its trains at the town of Blue Springs. The company in its answer stated that there was already a station at Wymore, a little over a mile from Blue Springs, and that there was no necessity for an additional station. In the opinion rendered by Chief Justice Cobb, the Court says:

"The more important and quasi public question of the powers of the courts in the absence of legislation to compel the respondents to establish and maintain a depot at Blue

Springs is raised by the respondent in its brief, and that question will be first considered.

"Relator in his brief contends that the legislation of the state has imposed upon the respondent the duty of furnishing side-tracks and depots, and stopping its trains for the receipt and discharge of passengers and freight, and the proper transaction of business at all places upon their road, etc., and he cites section 121, chap. 165, page 155, compiled statutes, in support of that proposition.

"I do not think that this section furnishes authority for the interference of the courts to compel the establishment of a depot at stations at any point on the line of respondent's road, but on the contrary it is quite apparent upon the face of the section that everything thereby imposed is qualified by the words "to and from such stations as the trains stop at," and its application limited to established depots.

"But in the opinion of the Court it has authority to grant relief in cases such as that presented in this case; yet for the source of this authority it must look to the principles of the common law rather than to legislative enactments. The respondent is a common carrier of persons and merchandise. At common law it was the duty of a common carrier by land to deliver freight personally to the consignee, but when railways took the place of conveyances drawn by animals, necessity required the relaxation of this rule so as to allow of the susbtitution, in place of personal delivery, of a delivery at the warehouse or depot provided by the company for the storage of goods.

"Is it too much to say that this relaxation of the above rule in favor of railway companies as common carriers imposed upon them the duty of providing suitable depots for the purpose of delivery? This duty is so intimately connected with the business for which railways are built and managed that motives of self interest almost always secure its observance. But when for any reason it is neglected or refused, may it not be enforced the same as any other public duty?"

After considering at length the circumstances of the case and citing a number of other cases, the Court concludes as follows:

"While I frankly admit that I am able to find no case, certainly none has been called by counsel, when the above principles have been applied to circumstances exactly like those of the case at the bar, yet I am unable to distinguish it in principle from those in which it has been often applied, and we are, I think, unanimously of the opinion that they furnish no sufficient warranty for the exercise of the authority invoked.

"As to the two questions presented by the record as above stated: First—Whether the depot of the respondent at Wymore is sufficiently near to the business portion of Blue Springs as to afford the latter named place all the facilities and accommodations which the respondent owes to them as a common carrier, etc., and if not, Second—Is it practicable to operate respondent's branch line of railroad between Wymore and Beatrice with depots and regular service there—at both, at Wymore and Blue Springs. We have upon thorough examination of the evidence and consideration of the same, together with arguments therein, as well at the bar as in the exhaustive printed briefs of counsel, found both of these questions for the relator.

"A peremptory writ will therefore issue substantially as prayed with costs, etc. Writ allowed."

OLD AND NEW ROADS.

Annapolis & Elkridge.—The Maryland Court of Appeals, in the case brought before it, having decided that this road can be sold under the mortgage, the trustees have filed their petition in the Circuit Court, at Annapolis, Md., asking that they may be put in possession of the road. The Court has set aside objections filed by the company, and ordered that its answer be filed by Aug. 19, in default of which the petition of the trustees will be granted without further delay.

Atlantic & Pacific—It is reported that this company will shortly begin work on an extension of the Central Division westward 100 miles from its present terminus at Red Fork, in the Indian Territory.

Beech Creek, Clearfield & Southwestern.—The *Mining Herald and Colliery Engineer* gives the following description of this road, built to give the Reading a line into the Clearfield bituminous coal district, but now transferred to the Pennsylvania Railroad Co.:

"The Beech Creek, Clearfield & Southwestern Railroad extends from Jersey Shore, 16 miles west of Williamsport, to Phillipsburg on the western edge of Centre County, a distance of about 75 miles. The general course of the road is almost southwesterly. For nearly 10 miles after leaving Jersey Shore the road runs along the Susquehanna River. Near Lock Haven a narrow, shallow stream called Beech Creek empties into the Susquehanna. The railroad here leaves the river, and ascends the valley of the creek All mountain streams are crooked, but few can show a more tortuous course than Beech Creek. In and out of the mountains forming the Bald Eagle Ridge the little river flows, and the railroad follows its winding course. In some places the road is one continuous series of curves, some of them quite long and others short.

"The railroad follows this crooked creek to Snow Shoe Summit, where it has its source. This place is about 40 miles from Lock Haven, near which the creek empties into the Susquehanna. As its name implies, it is the summit of the Snow Shoe range. The road crosses a plateau until it strikes the Moshannon Creek, 6 miles beyond Snow Shoe. This creek flows nearly north to the West Branch of the Susquehanna. It is the boundary between Centre and Clearfield counties. The road runs up the Moshannon about due south to Phillipsburg, 18 miles away. This is the terminus of the main line.

"There is a branch which starts out from the main line at Munson's Mill, 7 miles east of Phillipsburg, and runs in a westerly direction. This branch is 41 miles long, and runs to Gazzam, a prospective town 2 miles from Ansonville, Clearfield County. One of the large coal fields owned by the company is located here. This branch has not yet been fairly opened, no passenger trains are run, and the only business done is the transportation of a few cars of coal a day. At Woodland, about half way between Munson's Mill and Gazzam, a small branch 4 miles long extends to Clearfield, the county seat. There are, of course, laterals along the main line leading to the various coal mines and lumber mills which ship their product over the road."

Cadillac & Northeastern.—This road, which is of 3-ft. gauge and built chiefly for logging puposes, is now completed from Cadillac, Mich., on the Grand Rapids & Indiana road, east by north to Muskrat Lake, 10 miles. A ferry on the lake connects the terminus with Lake City, the county seat of Missaukee County. The road was opened for business Aug. 17.

Central Transportation Co.—Mr. George M. Pullman has addressed a letter to the officers of this company stating that, as the amended lease of the company's property to Pullman's Palace Car Co. has been repudiated by the company, he believes that all relations between the two companies should cease. He states, therefore, that as soon as possible the Pullman Co. will return all the cars belonging to the Central Transportation Co., and asks that an agent be appointed to receive them.

It will be remembered that the directors of the Central Transportation Co. agreed to a modification of the lease under which the rental was to be largely reduced. The stockholders, however, refused to ratify this agreement. Since then the Pullman Co. has tendered the rental under the new lease, but the directors of the Central Transportation Co. have refused to receive it, and have begun suit to recover the rental due under the old lease.

A special meeting is called for Sept. 15 to act on various questions affecting the relations of the company with the Pullman Co., and the disposition of the surplus assets of the company.

Chicago, Burlington & Northern.—A contract has been awarded to Reynolds & Co., of Rock Island, Ill., for grading this road from Arlington, Ill., to the crossing of the Wisconsin River, a distance of 130 miles. A large force will be put on the work as soon as the final location is completed.

A conference was recently held in La Crosse, Wis., at which an agreement was reached as to the line through that city and the crossing of the Chicago, Milwaukee & St. Paul tracks there. The crossing will not be at grade, and no opposition will be made by the St. Paul Co. to the new line.

Chicago, Milwaukee & St. Paul.—This company has begun surveys for an extension of its Ottumwa Branch from Ottumwa, Ia., to Kansas City, and it is announced that work on the line will be begun early in the spring. This line has been talked about several times before, and its construction, if really begun as stated, is apparently in retaliation for the Chicago, Burlington & Quincy's new line to St. Paul.

Chicago & Northwestern.—It is said that this company will soon begin work on a branch from Fulton, Ill., up the east side of the Mississippi to Galena. It is also reported that work will be begun shortly on the extension from Freeport, Ill., to the Mississippi for which surveys were made some time ago.

Reports are still current that the Chicago, St. Paul, Minneapolis & Omaha is to be consolidated with this company, probably by exchange of Chicago & Northwestern stock for the outstanding stock of the controlled line.

Chicago, St. Paul, Minneapolis & Omaha.—This company has let a contract to J. T. Moulton & Son, of Chicago, to build an elevator that will hold 800,000 bushels of corn, at Washburn, Wis., on Ashland Bay. Owing to the hard and rocky bottom of the bay at Washburn and the impossibility of driving piles there, the elevator must be built on cribwork raised about 20 or 25 ft. from the bottom of the bay, which makes the construction costly. The contract price for the structure is $225,000. For the cribs underneath this elevator about 2,000,000 ft. of 12 by 12 timber, 10,000 cords of stone, and a great quantity of bolts and other iron will be needed.

There has been considerable dealing in this company's stock in New York lately, based on rumors that the company is to be consolidated with the Chicago and Northwestern. The report is that the Northwestern will issue one share of its own common stock for one of Omaha preferred and one share for two of Omaha common. This would, of course, be a very good exchange for the outside holders of the stock.

Chicago, Wisconsin & Minnesota.—This company has filed articles of incorporation to build the Wisconsin Central extension from Schleisingerville, Wis., to Chicago, 116 miles.

Cincinnati, Lebanon & Northern.—The plan on which the purchasers of the Cincinnati Northern road have organized this new company is simple. All the old bonds are to be turned in, and stock to the full value of his holdings accepted in return by each bondholder. Then $200,000 new first mortgage bonds bearing 5 per cent. interest are to be issued. This will let the road start anew, with only 5 per cent. on $200,000, or $10,000 per annum, as fixed charges.

Cincinnati, New Orleans & Texas Pacific.—The men employed in the shops at Meridian, Miss., struck on Aug. 25. They numbered about 300 and were joined by some of the trainmen. All freight trains were stopped and only mail trains allowed to pass through, but the company's property was carefully guarded. The cause of the strike was the company's failure to pay, the wages for June and July being now overdue. The company states that the pay car has been sent out with the June wages. It is thought that the strike may extend to other points on the line.

Columbus & Eastern.—This road has used the tracks of the Ohio Central from Columbus to Hadley Junction, O., since its completion, under a temporary lease. On Aug. 24 an agreement was concluded under which the Columbus & Eastern will lease for 99 years the Columbus Branch of the Toledo & Ohio Central (formerly the Ohio Central) road.

It is said that preparations are being made to extend the Columbus & Eastern from its present terminus at Redfield, O., eastward to McConnellsville on the Muskingum River.

Evansville, Washington & Brazil.—Work has been in progress for some time on the construction of this road from Washington, Ind., to Worthington. Tracklaying was recently begun, and the rails are now reported laid to Plainville, 12 miles from Washington, with work progressing steadily toward Worthington, 25 miles further. The road is an extension of the Evansville & Indianapolis, which is in operation from Evansville, Ind., to Washington, 58 miles. At Washington it will connect with the Terre Haute & Southeastern, completing a second line from Evansville to Terre Haute, on the line of the old Wabash & Erie Canal.

Fort Worth & New Orleans.—A contract has been let for the construction of this road from Fort Worth, Tex., to Corsicana, 72 miles, work to be begun at once. The road will connect Fort Worth with the Houston & Texas Central and the Texas & St. Louis roads.

Georgia Pacific.—It is stated that arrangements have been made for raising the money to complete the gap in this road west of Birmingham, Ala., provided the people of that place will raise $100,000 as a bonus. More than half the amount required has already been raised, and no difficulty is expected in securing the rest.

Green Cove Spring & Midland.—This company has been organized by the parties who recently purchased the Green Cove Spring & Melrose road at judicial sale. The road is now in operation from Green Cove Spring, Fla., to Sharon, 12½ miles, and an extension of 22 miles to Melrose is partly graded. It is of 3 ft. gauge.

Houston & Texas Central.—The trustees of the Main Line and Western Division first mortgage have issued a circular stating that the accounting proceedings have been concluded, and that they have received under the decree property as follows for account of the respective trusts: For account of the main line mortgage: 177 first-mortgage main line bonds, $177,000; 84 second-mortgage Waco & Northwestern bonds, $84,000; cash, $64,758; account against John J. Cisco & Son, $45,079. In addition to which there is held for use under said decree notes of land purchasers bearing 8 per cent. interest and secured by mortgage on lands sold, $489,483.

For account of Western Division mortgage: For 44 first-mortgage Western Division bonds, $44,000; cash, $3,846; notes of like character as above and held in same manner, $97,302; total on both mortgages, $1,005,470.

The Main Line and Western Division bonds have been canceled for account of their respective sinking funds.

Illinois Midland.—In the United States Circuit Court in Chicago, Aug. 22, Mr. Justice Harlan, after hearing arguments, entered an order allowing an appeal to the United States Supreme Court from the final decree of foreclosure and sale of this road. The order is also made a *supersedeas* as to the order of sale, and consequently postpones the sale, which was to take place Sept. 1, until the case has been heard in the Supreme Court. The case will probably not come up in that Court for two or three years, and the road cannot be sold in that time, provided appellants enter the necessary appeal bond.

Lake Shore & Michigan Southern.—This company's statement to the New York Railroad Commission gives the following figures for the quarter and the half-year ending June 30:

	Quarter.		Half year.	
	1885.	1884	1885.	1884.
Earnings	$3,256,132	$3 538,377	$6,485,203	$7,222,398
Expenses	2,178,304	2,030,211	4,516,782	4,361,042
Net earnings	$1,071,828	$1,508,166	$1,968,421	$2,861,356
Interest, etc.	1,035,132	1,307,264	2,044,331	1,967,431
Surplus or deficit.	D. $13,304	S. $470,902	D. $75,910	S. $893,925

The decrease in gross earnings for the half-year was $737,195 (10.2 per cent.); in net earnings, $892,935 (31.2 per cent.), and in surplus, $969,835.

The balance sheet of June 30 shows a total of $2,608,616 floating liabilities, of which interest accrued makes $339,610, and current accounts for wages, supplies, etc., $2,269,006 cash, and cash assets amount to $998,707, leaving a balance of $1,609,909 net floating debt. The funded debt shown is $47,466,000, a reduction of $250,000 since Dec. 31. Other changes are mainly in form.

Louisville, New Albany & Chicago.—This company has arranged with the Cincinnati, Hamilton & Dayton for some amendments to the traffic contract between the two companies by which the through service between Chicago and Cincinnati will be improved.

Mammoth Cave.—Surveys are reported in progress for a railroad to run from Glasgow Junction, Ky., on the Louisville & Nashville road, northward to the Mammoth Cave, a distance of 10 miles. The line is to be continued beyond the Cave to Grayson Springs in Edmonson County, about 15 miles further.

Midland, of Indiana.—The extension of this road from Noblesville, Ind., to Lebanon is reported all graded. The ties have been distributed along the line and track-laying will soon be begun.

Minneapolis, Sault Ste. Marie & Atlantic.—Work on the extension of this road from Bruce, Wis., eastward has been much delayed by heavy rains. The intention is to complete 22 miles this year, which will make the road 68 miles long and carry it into a region of heavy pine timber. The rails have been laid from Bruce east 9 miles to the Flambeau River, and tracklaying will be resumed as soon as the bridge over that stream is finished.

Missouri, Iowa & Nebraska.—The United States Circuit Court has authorized Receiver Thatcher to issue certificates to the amount of $400,000, the proceeds to be used to buy steel rails and necessary equipment for the road.

New York & Manhattan Beach.—Agreements have been ratified by which the New York, Bay Ridge & Jamaica and the Long Island City & Manhattan Beach companies have been consolidated with this company. The change is entirely formal, as the roads of those companies have heretofore been leased to the Manhattan Beach Co., and have formed part of its lines.

New York & New England.—On July 11, the United States Circuit Court made an order directing the sale of all the equipment held by this company under the car trust, and Mr. E. B. Phillips, President of the Fitchburg Railroad Co., was appointed as an expert to examine and appraise the rolling stock. He has filed with Judge Shipman his report of his appraisal as follows: 51 engines, averaging $6,000 each, $307,076; 18 passenger cars, $3,500 each, $63,000; 2 baggage cars, $3,120; 4 express cars, $2,528; 33 cabooses, $12,347; 299 box cars, about $350 each, $105,427; 546 gondola cars, $153,142, and 370 coal cars, about $305 each, $113,347; total, $759,987.

The sale is to take place in Hartford, Conn., about Sept. 15. The equipment was estimated to be worth $1,341,000, considerably more than Mr. Phillips' appraisal.

New York, West Shore & Buffalo.—Drexel, Morgan & Co., on Aug. 22, gave notice that the time for receiving bonds under their circular would expire absolutely on Aug. 25, and that after that date no bonds would be received except from holders who should have already deposited the contract agreement properly signed. Bonds not deposited on that date will only be received on such terms as may be determined on hereafter by the committee, which is to be appointed to carry out the agreement and manage the foreclosure.

On Aug. 25 Drexel, Morgan & Co. issued the following: "The time limited in our notice of Aug. 11, 1885, for accepting the offer made in our circular of July 25 having expired, we hereby notify the parties in interest that the holders of over $47,500,000 have accepted the offer contained in our circular and deposited their bonds with us for the purpose of carrying out the plan of reorganization and lease therein referred to. We shall be prepared, on and after Thursday, Aug. 27, to exchange the temporary receipts given at the time of deposit of the bonds for engraved negotiable receipts countersigned by the Union Trust Co. These certificates will be issued in amounts of $1,000 and $10,000 each, and application has been made for their quotation upon the New York Stock Exchange. The owners of outstanding unassented bonds who may desire to obtain the benefit of our circular of July 25 may deposit their bonds with us until further notice, upon payment of the sum of $20 for each bond of $1,000 so deposited."

Northern Central.—This company's statement for July and the seven months to July 31 is as follows:

	July.		Seven months.	
	1885.	1884.	1885.	1884.
Earnings	$411 722	$477,516	$3,009,494	$3,097,771
Expenses	300,659	306,260	1,855,256	1,978,172
Net earnings.	$111,063	$171,256	$1,154,238	$1,119,599

For the seven months there was a decrease in gross earnings of $88,277, or 2.9 per cent., with a decrease in expenses of $122,916, or 6.2 per cent., the result being a gain of $34,639, or 3.1 per cent., in net earnings.

Ohio Central.—In the United States Circuit Court at Charleston, W. Va., Aug. 21, a bill was filed by D. H. Gould and others asking for an injunction to prevent any sale or transfer of any part of the road east of Charleston, and also asking for a receiver. No part of the road is completed beyond Charleston, which is the terminus of the River Division, and the suit is apparently intended to prevent the transfer of the franchise of the proposed extension, which

was to connect with the Richmond & Allegheny road, with the River Division, which is soon to be sold under foreclosure.

Omaha Belt.—The Court has refused to grant the injunction asked for by the Union Pacific Co. to restrain S. H. H. Clark and others from acting as officers of this company or voting on its stock, provided that no new board of directors shall be chosen and that no sale of the property shall be made and no action taken which shall impair the lien of the Union Pacific Co. for money advanced.

Pennsylvania.—This company's statement for July shows for all lines east of Pittsburgh and Erie, as compared with July, 1884, a decrease in gross earnings of $303,980; a decrease in expenses of $72,913, and a decrease in net earnings of $281,067. For the seven months to July 31, as compared with the corresponding period last year, the same lines show a decrease in gross earnings of $2,317,636; a decrease in expenses of $494,187, and a decrease in net earnings of $1,823,449.

Carrying out these differences, we have the following statement:

	July.		Seven months	
	1885.	1884.	1885.	1884.
Earnings	$3,685,105	$3,989 085	$25,004,701	$27,322,337
Expenses	2,525,056	2,597,969	17,324,791	17.818,978
Net earnings	$1,160,049	$1,391,116	$7,679,910	$9,503,359
Per ct. of exps.	68.5	65.1	69.3	65.2

For the seven months the decrease in gross earnings was 8.5 per cent.; in expenses 2.8, and in net earnings 19.2 per cent.

For the seven months of 1885 all lines west of Pittsburgh and Erie show a deficiency in meeting all liabilities of $1,013,645, being an increased deficiency (or net loss) of $300,485, as compared with the corresponding period of last year. This shows a total falling off of $2,123,934 on all lines.

A Philadelphia dispatch says: "The special meeting of Pennsylvania Railroad directors called yesterday was to authorize the issue of the first installment of $1,500,000 new 3 per cent. bonds, to be used in the South Pennsylvania purchases under the agreement between Mr. Vanderbilt and Pennsylvania Railroad. The holders of South Pennsylvania securities were to receive dollar for dollar in 3 per cent. bonds guaranteed by the Pennsylvania Company. This would require the issue of $5,500,000 worth, and it is intended to base them on the status of the smaller branches or leased lines of Pennsylvania Railroad, a proceeding which is objected to by the anti-Vanderbilt holders."

Philadelphia & Reading.—The Receivers' statements give the following figures for the earnings of the railroad for July and the eight months of the fiscal year from Dec. 1 to July 31:

	July.		Eight months.	
	1885.	1884.	1885.	1884.
Earnings	$2 641,851	$2,767.791	$17,667,616	$19.284.097
Expenses	1,503,784	1.551,012	10,889,401	11,674,923
Net earnings	$1,138,067	$1.216,779	$6,778,215	$7.609,174

For the eight months this shows a decrease of $1,616,481, or 8.4 per cent., in gross, and of $830,959, or 10.9 per cent., in net earnings.

The traffic of the railroad lines was as follows:

	July.		Eight months.	
	1885	1884.	1885.	1884.
Passengers	2.294,452	2 253,144	14.877,346	15,495.734
Tons merchandise	724.602	726.575	5,147.783	5.840,314
Tons coal	1,153.759	1,017,237	7,351.272	6,943.452
Tons coal on colliers.	44,120	40,217	359,574	341,043

Coal shows a slight gain for the eight months, but all other traffic a considerable decrease.

The statement for the Philadelphia & Reading Coal & Iron Co. is as follows:

			Eight months.	
	1885.	1884.	1885.	1884.
Earnings	$1,364.030	$1,433 684	$9,074,969	$9.598,058
Expenses	1,378,349	1,285.967	9,296,926	9.999.902
Net or def't.	D.$14,319	N. $47.717	D $221,957	D. $401,844

The eight months show a decrease of $523,089, or 5.4 per cent., in gross earnings, but there was a reduction of $179,887, or 44.7 per cent., in the deficit.

The coal mined from the company's lands was, in tons:

	July.		Eight months.	
	1885.	1884.	1885.	1884.
By Coal & Iron Co.	490,324	418,041	2,973,061	2,664.353
By tenants	73.428	65,181	479,711	474.437
Total	563,752	483,221	3,452.772	3,138,790

Both the month and the year here show a considerable gain.

The joint net earnings of the two companies compare as follows:

	July.		Eight months	
	1885.	1884.	1885.	1884.
R. R. Co	$1,138,067	$1,216,779	$6,778,215	$7,609.174
C. & I. Co.	*14,319	47,717	*221.957	*401,844
Total	$1,123,748	$1,264,496	$6,556,258	$7,207,330

* Deficit.

The decrease for the month was $140,748, or 11.1 per cent., for the eight months $651,072, or 9.0 per cent. The expenses do not include anything for interest or rentals of either company.

Rome, Watertown & Ogdensburg.—This company's statements to the New York Railroad Commission give the following figures for the quarter ending June 30 and the nine months of the fiscal year from Oct. 1 to June 30:

	Quarter.		Nine months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$418.913	$411,926	$1.219,297	$1,184,396
Expenses	271,914	259,169	799,898	768,648
Net earnings	$146.999	$152,757	$419,399	$415,748
Rents, etc.	6,498	8,505	4,459	5,654
Total income	$153,497	$161,262	$423,858	$421.402

For the nine months the gross earnings increased $34,901, or 3.0 per cent.; the net earnings $3,650, or 0.9 per cent., and the net income $2,456, or 0.6 per cent.

St. John Bridge.—The opening for traffic of the bridge over the St. John River at St. John, N. B., which was expected this month, has been postponed until early in September, the work on the approaches not being quite ready.

St. Louis, Fort Scott & Wichita.—This company has completed extensive stock yards at the terminus of its road, two miles west of Anthony, Kan., and several shipments of cattle have already been made from that point. These yards are made on the latest improved plan and have four chutes for loading cattle. There are two good streams of running water at the yards and an abundance of sand for bedding. They are located 9 miles from the Indian Territory line.

St. Paul, Minneapolis & Manitoba.—The report that the Chicago, Burlington & Quincy Co. had bought a controlling interest in this company is disproved by the fact that at the annual meeting last week only one change was made in the board. The new director, Mr. Henry D. Minot, of Boston, represents Boston parties who have, it is said, bought all, or a part, of the stock owned by Mr. Kittson, of St. Paul. This stock has been on the market for some time.

The statement presented at the annual meeting last week gives the following figures for the year ending June 30:

	1884-85.	1883-84.	Inc. or Dec.	P.c.
Earnings	$7,973,760	$8.256.868	D. $283,108	3.4
Expenses, interest, etc.	5,490,208	5,879,083	D. 388,875	6.6
Net surplus	$2,483,552	$2.377,785	I. $105.767	4.4

Taxes are included in expenses. Dividends were paid last year amounting to $1,300,000, or 6½ per cent. on the stock.

A dispatch from St. Paul, Aug. 25, says: "Railroad circles have been much interested to-day over rumors of a projected railroad scheme of more than ordinary importance, to be developed by the Manitoba Co. The scheme is said to be the construction of a line from Duluth to Crookston, and the extension of the Devil's Lake Branch of the Manitoba from its present terminus to the falls of the Upper Missouri River. This would give a new Manitoba system of between 600 and 700 miles—from Duluth to the Missouri River—through the very centre of that region lying between the systems of the Northern Pacific and Canadian Pacific lines, and having at Duluth a lake outlet for all the freight brought from that region. The fact that the Manitoba has a surveying party out running a line from Crookston east in the direction of Duluth, and that President Hill, of the road, is now at Duluth with other officers looking over the company's terminal facilities there, is cited as giving good color to the report that such is intended."

San Antonio & Aransas Pass.—The grading on this road is now well advanced from San Antonio, Tex., to Floresville, 30 miles, and track-laying was begun at San Antonio last week.

Saratoga & St. Lawrence.—This company has been organized to build a railroad from Moira, N. Y., on the Northern Adirondack road, to Bombay in Franklin County, a distance of 8 miles.

Savannah, Florida & Western.—This company, it is said, is about to establish a steamship line between Savannah and New York, to run in connection with its railroad lines in Georgia and Florida.

Silver Springs, Ocala & Gulf.—This road is intended to run from Silver Springs, Fla., west through Ocala to Blue Spring and thence southward through Hernando County to deep water on Tampa Bay, a distance of 135 miles in all. Work is now being actively pushed, and the company hopes to complete the entire line within a year. Track is laid from Silver Springs to Ocala, 6 miles, and 14 miles more are ready for the rails. The road is of standard gauge, and is laid with 56-lb. rails.

Southern Pacific Co.—The earnings and expenses of the whole system operated by this company are given below for the month of June. The Pacific system of 3,005 miles comprises the old Central Pacific system (embracing the Southern Pacific railroads of California, Arizona and New Mexico), and also the Northern Division of the Southern Pacific Railroad of California, which was formerly reported separately. The Atlantic system of 1,580 miles embraces the Galveston, Harrisburg & San Antonio; Texas & New Orleans; Louisiana Western; and Morgan's Louisiana & Texas Railroad:

1885.	Pacific system.	Atlantic system	Total.
Earnings	$1,822,414	$602,852	$2.425 266
Expenses	732 002	415.497	1,147,500
Net earnings	$1,090,412	$187,354	$1,277,766
1884.			
Earnings	$2.045,075	$371,196	$2,416,272
Expenses	1,167,414	371.298	1,538,712
Net earnings	$877,661	Loss, $102	$877,559

The increase in net earnings for June this year was $400,207, or 45.6 per cent. To this year's earnings are to be added also the rent of the Mohave Division, $36,355, making the total gain over June of last year $436,562. The very small gross earnings and the deficit reported for June, 1884, were due to the extraordinary freshets, interrupting the trafic of the road.

South Pennsylvania.—On Aug. 25 Attorney-General Cassidy, of Pennsylvania, filed a bill in equity, in the Dauphin County Court of Common Pleas, asking for an order restraining the Pennsylvania or its agents from purchasing or by any means, direct or indirect, acquiring control of either the South Pennsylvania or the Beech Creek road. The bill is based on Article XVII. of the Constitution of Pennsylvania. Section 4 of this article provides that "no railroad, canal, or other corporation, or the lessees, purchasers, or managers of any railroad or canal corporation shall consolidate the stock, property, or franchises of such corporation with, or lease or purchase the works or franchises of, or in any way control, any other railroad or canal corporation owning or having under its control a parallel or competing line." The Attorney-General said on the same day: "I propose to have the question finally determined whether a great railroad is simply a private corporation or an institution for the public good—a common carrier. I am proceeding in the matter as the legal representative of the state, so that it cannot be charged that the action was instituted by any interested parties. I, of course, understand that the Pennsylvania Railroad Co. will contend that they secured their charter prior to the adoption of the new Constitution, and that they are therefore exempt from its provisions. Nevertheless, I propose to have the courts finally decide the matter."

Preliminary injunctions were granted and made returnable Sept. 8.

A letter to Mr. Vanderbilt, protesting against the transfer of this road and the Beech Creek line, has been published. The letter is signed by Dr. Hostetter, E. C. Knight, I. V. Williamson, George De B. Keim, Henry Lewis, J. Lowrie Bell, C. and H. Borie and H. Sellers McKee, all of whom, except Dr. Hostetter, are largely interested in the Reading road

Texas & St. Louis.—A plan for the reorganization of this company has been agreed on by the committee, and will be submitted to the holders of securities shortly.

Toledo, Columbus & Southern.—This company has completed a connection with the Indiana, Bloomington & Western at the southern terminus of its road at Findlay, O., and has arranged for an interchange of business with that line.

Wabash, St. Louis & Pacific.—The strike of the shopmen on this road has made very little progress, though a considerable number of men have left the various shops. The representatives of the Knights of Labor are now, negotiating with the representatives of the road for a settlement of the questions in dispute.

The Receivers have submitted to the Court their quarterly report, giving the earnings and expenses of different leased lines of which they have been instructed to keep separate accounts. Besides giving the status of the roads for the quarter ending May 31, 1885, the report also gives the excess of earnings or expenses of each line for the year just following the appointment of the receivers.

Roads whose expenses have exceeded their earnings:

St. Joseph & St. Louis	$70,164
St. Louis, Ottumwa & Cedar Rapids	18,709
Council Bluffs & St. Louis	9,506
Clarinda & St. Louis	8,087
*Quincy, Missouri & Pacific	20,551
*Missouri, Iowa & Nebraska	28,061
Des Moines & St. Louis	64,312
Des Moines & Northwestern	21,626
Eel River	30.648
*Champaign, Havana & Western, to May 16	29,635
*Cairo Division, till April 27	124,825
Attica, Covington & Southern	4,087
Peoria, Pekin & Jacksonville	37,968
Springfield & Northwestern	53,799
St. Louis, Jerseyville & Springfield	32,295
Champaign & Southeastern	5,772
*Havana, Rautoul & Eastern	16,965
Total excess of expense over earnings	$575,011

In the accounts of the following roads there is an excess of earnings over expenses, not including any charge for interest or rentals:

Boone County & Boonville	$7,318
St. Louis, Council Bluffs & Omaha	31,323
Brunswick & Chillicothe	33,348
Centreville, Moravia & Albia	3.274
*Toledo, Peoria & Western	107.915
Chicago Division	3,107
Detroit, Butler & St. Louis	39 043
Indianapolis Division	86,526
Total earnings over expenses	$311,920
Grand total expenses over gross earnings	$263,091

The lines marked with an * have been surrendered under orders of the Court.

The Des Moines & Northwestern Railroad Co., owner of a branch extending from Des Moines to Fonda, Ia., a distance of 115 miles, has filed an intervening petition asking that, in accordance with the terms of the lease by which the road was acquired, the Wabash Receivers be compelled to keep the road in repair and safe for travel and business; that they allow the petitioner 40 per cent. on all through freight; that they keep a separate account of the road; that they set apart 30 per cent. of the gross earnings, and appiy the same to the payment of the taxes and the interest on the general mortgage bonds issued to the petitioner, and to the payment of dividends on its stock.

Wisconsin Central.—The contract for the grading, masonry, tracklaying and all work on this company's extension from Schleisingerville, Wis., to Chicago, except the truss bridges, has been let to Harrison & Green, of Milwaukee, Wis., who agree to have the grading done by Dec. 1 and the track laid by Feb. 15 next. The line is to run through Waukesha and Burlington, Wis., and will be about 116 miles long. The survey is now nearly completed and most of the right of way has been obtained. The road will be built by a separate corporation, but will be operated by the Wisconsin Central Co. under lease.

Yadkin.—At a recent meeting of the stockholders in Salisbury, N. C., it was resolved to have a survey made of the projected line, which is to run from Salisbury northward through the Yadkin Valley.

ANNUAL REPORTS.

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Georgia Pacific	357	St. L., Iron Mountain & So	528
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Allegheny Valley.

This company works the River Division, including the main line from Pittsburgh to Oil City, 132 miles, and the Plum Creek Branch, 7 miles, the Low Grade Division, from Red Bank, Pa., to Driftwood, 110 miles, and the Sligo Branch, 10 miles; a total of 259 miles. There was no change in mileage last year. Since May 2, 1884, the road has been in possession of Receivers, but the company's report presents statements for the full year 1884.

The equipment includes 71 locomotives; 31 passenger, 11 combination and 8 baggage and mail cars; 297 box, 1 stock, 1,478 gondola, 32 flat, 256 boiler tank and 32 caboose cars; 1 directors' and 1 pay car, 4 wrecking, 1 fire extinguisher and 15 boarding cars.

Additions last year were 3 passenger cars, 1 box, 1 caboose

and 1 boarding car. There was no change in the motive power.

The general account, condensed, is as follows :

Stock		$2.166,500
Mortgage bonds		16,500.000
Real estate bonds and mortgages		123,944
Income bonds		9.720,400
Guaranteed coupons bought by Pa. R. R. Co		4,531,125
Interest accrued		418,629
Other accounts		167,043
Total		$33,627,651
Road and property	$24.049.540	
Materials	108,181	
Accounts and balances	114.683	
Cash	356.116	
Unavailable assets : bad accounts, etc	390,695	
Profit and loss, debit balance	8,608,436	
		33,627,651

The mortgage debt consists of $4,000,000 River Division 7.3 per cent. first-mortgage bonds; $10,000,000 Low Grade Division 7 per cent. first-mortgage bonds, and $2,500,000 Low Grade Division 5 per cent. second-mortgage bonds. Of the income bonds, $6,087,000 are held by railroad companies and $3,633,400 by individuals.

The traffic for the year was as follows:

Train-miles:	1884.	1883.	Inc. or Dec.	P.c.
Passenger	659,058	566,452	I. 83,606	14.8
Freight	978,390	970,387	I. 8,003	0 8
Service	79,165	98,282	D. 19,117	19 5
Total	1,707,613	1,635,121	I. 72,492	4.4
Pass car-miles	2,046,491	1,865,371	I. 181,120	9.7
Freight car-miles	19,870.447	18,610,497	I. 1,259.950	6.8
Passengers carried	985.591	1,053,529	D. 67,938	6.4
Passenger-miles	17,169,870	19,128,645	D. 1,958,775	10.2
Tons freight carried	2,751.154	2,875,254	D. 124,100	4.3
Ton-miles	163,275,465	155,251,631	I. 8,023,834	5.2
Av. train-load :				
Passengers, No	26.4	33 8	D. 7.4	21.9
Freight, tons	166.9	160.0	I. 6.9	4.3

The average passenger journey last year was 17.4 miles; the average freight haul 59.3 miles. Of the freight cars hauled on the River Division, 41 per cent., and on the Low Grade Division 45.5 per cent., were empty cars. The average receipt and cost per unit of traffic were, in cents :

	1884.			1883.		
	Receipt.	Cost	Net	Receipt.	Cost.	Net.
Per pass.-mile	2.815	1.867	0 948	2.748	1.638	1.110
Per ton-mile	0 962	0.595	0.367	1.074	0.677	0.397

The average rate last year on through freight was 0.672, and on local 0.994 cent per ton-mile. The local freight includes a large amount of coal and other coarse freights necessarily taken at low rates. In 1872 the average rate per ton-mile was 2.58 cents, but since that time there has been a steady decrease.

The earnings for the year were :

	1884.	1883	Inc. or Dec.	P.c.
Freight	$1.571.176	$1,666,689	D. $95,513	5.8
Passengers	483,372	525,758	D. 42,386	8.1
Mail, etc	59,334	63,495	D. 4,161	6.6
Total	$2 113.882	$2,255.942	D. $142,060	6.3
Expenses	1,292,563	1,364,328	D. 71,765	5.3
Net earnings	$821,319	$891,614	D. $70,295	7.9
Gross earn. per mile	8,192	8,710	D. 548	6.3
Net " "	3,171	3.443	D. 272	7.9
Per cent. of exps	61.2	6 .5	I. 0.7	....

Expenses last year included $55,621 for extraordinary repairs and additions to property. The proportion of expenses to earnings on the River Division was 60.2; Low Grade Division, 62.4; Sligo Branch, 159.6 per cent.

The income account for the year was as follows :

Net earnings, as above		$821,319
Paid for real estate	$3,458	
Interest on bonds and car trusts	1,132,360	
Interest on income bonds	328,972	
		1,464,790
Deficit for the year		$643,471

The interest on income bonds was paid in new income bonds and in scrip convertible into such bonds, reducing the actual cash deficit to $314,499. Actual payments made included full interest on the River Division firsts, six months' interest on the Low Grade Division seconds, and the installment of $100,000 due the State of Pennsylvania on the Low Grade Division seconds.

During the year 423 tons of steel rails and 128,879 new ties were used in renewals; 2,500 cubic yards of stone ballast were put in. The improvement of the Pittsburgh yard was continued and many minor improvements made in buildings and bridges. Some extraordinary repairs were made necessary by high water early in the year.

The President's report sets forth at length the proceedings under which a receiver was appointed for the road. The necessity for such action was indicated by the statements made in previous reports.

Boston, Hoosac Tunnel & Western.

This company owns a line from Rotterdam Junction, N. Y., to the Massachusetts line, 61½ miles, and leases branches from Saratoga Junction to Saratoga, 17½ miles, and from Schuylerville Junction to Schuylerville, 8 miles, making 87 miles worked. The leased branches have the same ownership as the main line, though under separate organizations. The report is for the year ending June 30.

The company's trains run over the Troy & Greenfield road from the state line to North Adams, Mass, 7 miles, paying tolls to the state of Massachusetts.

The equipment consists of 25 locomotives and 2 dummy locomotives; 10 passenger, 14 excursion, 4 combination and 5 baggage cars; 500 box, 150 stock, 300 coal, 30 flat and 11 caboose cars; 1 derrick and 10 construction cars.

The general account is as follows :

Stock		$3,551,010
Bonds		2,000,000
Continental Construction Co		946,158
Interest, accounts and balances		396,653
Total		$6,893,821
Road, etc	$6,516,097	
Materials	24,335	
Accounts	136,542	
Cash	3,583	
Deficiency to balance	213,264	
		6,893,821

The bonds are all of one issue, debentures bearing 5 per cent. interest.

The earnings for the year were as follows :

	1884-85.	1883-84.	Inc. or Dec.	P.c.
Earnings	$510,235	$427,038	I. $83,197	19.5
Expenses	538.439	406,411	I. 132,028	32.5
Net earnings	*$28,204	$20,627	D. $48,831	....
Gross earn. per mile	5,865	4,908	I. 957	19.5
Net " " "	237	....	....	....
Per cent. of exps	105.5	95.2	I. 10.3	....

* Deficit.

Taxes are included in expenses, amounting to $18,640 last year. The increase was entirely in through business, the local business showing a decrease. Through or trunk line freight formed 80 per cent. of the whole business, and it was carried at rates averaging 30 per cent. lower last year than in the previous year. Expenses were increased by increased service, by snow blockades and by damages to rolling stock from accidents.

In addition to the expenses, the sum of $18,362 was paid out for new construction during the year.

The traffic reported is as follows:

Train-miles:	1884-85.	1883-84.	Increase.	P. c.
Passenger	246,640	194,757	51.883	26.6
Freight	389,665	325,888	63.777	19 6
Switching	132,084	107,280	24.804	22.9
Total	768,389	627,925	140.464	22.4
Loaded cars moved	111.942	96,649	15,293	15 8
Empty " "	47,834	38.116	9,718	25.6
Loaded car-miles	5,567,484	4 478.731	1,088,753	24.3
Tons freight carried	1,175,391	985,819	189,572	19.2
Ton-miles	58,458,582	45,683,056	12,775,526	27.7

As stated above, over 80 per cent. of the freight traffic is through freight, and a large proportion of the cars in which it is hauled eastward are returned empty. The business exchanged with the West Shore road increased very largely last year, but was not profitable.

The average receipt and cost per train-mile and per ton-mile were, in cents :

Per freight train-mile :	1884-85.	1883-84.	Inc. or Dec.	P. c.
Receipt	66.40	67 84	D. 1.44	2.1
Cost	67.52	62.44	I. 5.08	8.2
Profit	*1.12	5.40	D. 6.52	....
Per ton-mile :				
Receipt	0.63	0.67	D. 0.04	5.9
Cost	0.61	0.59	I. 0.02	3.4
Profit	0.02	0 08	D. 0.06	75.0

* Loss.

The revenue per train-mile, including all trains, was last year 80.18 cents, and the cost 81.69 cents.

There were 20,000 new ties put in the track last year, and very extensive repairs made to cars. Three new locomotives were bought to replace old ones destroyed by accident, the cost of the new ones being included in expenses.

The report of General Manager H. L. Morrill says : "The ratio of expenses to earnings on your property is no guide to its value, and does not exhibit its economical workings, for the reason that the average rates have been less than cost the entire year, and a very large share of the tonnage was carried during the last half of the year at less than one-half the actual cost, while the best rates received only allow a small margin of profit.

"This property being a short link in two trunk lines, and having no considerable local business on which local rates can be secured, its traffic is subject to and governed by the trunk line combinations and their through rates, and during the bitter and relentless war of the past year rates have been lower than ever known, and your company has been compelled to carry three-quarters of the tonnage at ruinous rates, and a quantity at even less than 2 mills per ton per mile, while the average cost of same was about 6 mills."

Cumberland Valley.

This company owns a line from Harrisburg, Pa., to Williamsport, Md., 82.2 miles. It leases (and chiefly owns) the Dillsburg & Mechanicsburg, a branch to Mechanicsburg, Pa., 7.7 miles: the Martinsburg & Potomac, from Williamsport to Martinsburg, W. Va., 12 miles, and the Southern Pennsylvania, a branch to Richmond, Pa., with spur to Mercersburg, 21.4 miles. It owns, but does not lease, the Mont Alto road, from Mont Alto Junction to Waynesboro, Pa., 18.3 miles.

The company has completed its half century of existence, making its 50th annual report for the year 1884.

There was no addition to road worked last year, but about a mile of sidings and 2 miles of second or loop track were built.

The general account is as follows:

First preferred stock		$241,900
Second preferred stock		243,000
Common stock		1,292,950
Funded debt		270,500
Dividends and interest		41.314
Profit and loss, surplus		704,872
Total		$2,794,536
Road and equipment	$1,971,529	
Materials	27,527	
Trustees of contingent fund	600,119	
Balance of accounts	151,119	
Cash	44,242	
		2,794,536

The funded debt includes $161,000 firsts and $109,500 seconds. The contingent fund represents chiefly surplus invested in the leased lines.

The traffic for the year was as follows :

	1884.	1883.	Inc. or Dec.	P. c.
Pass. train miles	298 405	279,749	I. 18,656	6.7
Fr't " "	242,114	260,222	D. 18,104	6.9
Total loco. miles	650,122	632.952	I. 17,170	2.7
Passengers carried	689,218	548,712	I. 140.506	25.6
Pass.-miles	13,052,802	11,154,814	I. 1,897,988	17.0
Tons fr't carried	643,352	709,170	D. 65,818	9.3
Ton-miles	26,622,218	28,557,701	D. 1,935,483	6.8
Av. train load :				
Passengers, No	43 7	40 0	I. 3.7	9.2
Freight, tons	110.0	110.0	....	....
Av. receipt :				
Per pass.-mile	2.310 cts.	....	....	....
Per ton-mile	1.665 "	1.709 cts.	D. 0.044 ct.	2.6

The passenger traffic includes the branches; the freight, the main line only. The tonnage of the branches which did not pass on the main line was 1,816 tons only.

The earnings of the main line were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	$443.392	$488.300	D. $44.908	9.2
Passengers	273 381	257,991	I. 15,390	5.9
Mail, etc	51,559	46,772	I. 4,787	10.2
Total	$768,332	$793,063	D. $24,731	3.1
Expenses	554,994	570,019	D. 15,025	2.6
Net earnings	$213.338	$223,044	D. $9,706	4.3
Gross earn. per mile	9,347	9,648	D. 301	3.1
Net " " "	2,595	2.714	D. 119	4.3
Per cent of exps	72.2	71.9	I. 0.3	....

Expenses include all renewals and improvements of road, some of the improvements being of a substantial and permanent character.

The result of the year was as follows :

Net earnings		$213,338
State tax	$10,513	
Interest on bonds	22.867	
Dividends, 9½ per cent	168.896	
Real estate bought	9,476	
		211,752
Balance, surplus		$1,586

The total gross earnings, including the main line and the three leased lines, were $844,515, a decrease from the preceding year of $26,874, or 3.1 per cent.

The earnings of the leased and controlled lines were :

	Dills. & Mech.	Mart. & Pot.	So. Penn.	Mt. Alto.
Earnings	$27,643	$22.124	$26,416	$28,935
Expenses	23,719	19,801	20,257	27,975
Net earnings	$3,924	$2,323	$6.159	$960
Gross earn. per mile	5,641	1,844	1,232	1,581
Net " " "	801	194	288	52
Per cent of expenses	85.8	89.5	76.7	96.7

The Mont Alto road (which is not leased), carried last year 66,492 passengers and 42,210 tons of freight. This road comes into active competition with the Western Maryland road at Waynesboro.

During the year 385 tons of steel rails and 47,791 new ties were used in renewals. There were 5,728 ft. new sidings laid, and a loop or second track for freight trains was built around the town of Carlisle, the old track through the town being now used for passenger trains only. One shifting and 2 passenger locomotives, 4 passenger, 1 combination, 1 mail, 1 express and 2 stock cars were added to the equipment.

The completion of the Gettysburg & Harrisburg road has brought this line considerable traffic between Harrisburg and the junction of the new road.

Louisville & Nashville.

This company has issued a memorandum statement giving the results of its operations for the fiscal year ending June 30 last. Below is given a summary of this statement, which is not intended to take the place of the full report, which will be issued at the usual time.

The road operated at the close of the year was 2,015 miles, a reduction of 50 miles, owing to the expiration of the lease of the branch from Montgomery, Ala., to Selma. This lease expired May 1, 1885, and the branch was then surrendered to its owner, the Western Railroad Co., of Alabama. The average mileage worked was 2,057 miles, against 2,065 in the preceding year.

The general account, condensed, is as follows, compared with that of 1884:

Liabilities.

	1885.	1884.
Stock	$30,000,000	$30.000.000
Mortgage debt	61,958,314	57,530,712
Louisville city bonds	850,000	850.000
Debentures outstanding	....	529,800
Bills, accounts and balances	1,783,656	5,346,112
Profit and loss, balance	....	2,067,564
Total liabilities	$94,591,970	$96,324,188

Assets.

Cost of road and branches	$67,930,874	$67,776,064
Stocks and bonds owned	6,395,452	11,005,526
Stocks and bonds held in trust	9,527,878	9,527,878
Advances, leased and controlled lines	3,904.847	3,338,373
Claims in litigation	850,809	1,005.929
Supplies on hand	726,624	762,273
Real estate, quarry and timber lands	689,941	688,024
Accounts and balances receivable	1,771,487	1,922,804
Cash	404,714	297,317
Profit and loss, balance	2,479,344	....
Total assets	$94,591,970	$96,324,188

The total amount of stock is unchanged, but the $5,000,000 held by the company a year ago have been issued. The mortgage debt was decreased by $572,398 bonds of various issues, and increased by $5,000,000 new 10-40 adjustment bonds, of which $1,700,000 are still in the treasury; $529,800 debentures have also been retired. Securities owned include the $1,700,000 adjustment bonds; $622,750 other bonds of the company, and $675,000 Chicago & Eastern Illinois stock, the balance being stocks and bonds of leased and controlled lines. The total floating debt June 30 was $1,783,656, accounts receivable and cash amounting to $2,176,201. A year ago the net floating debt was $4,753,828. The company holds United States bonds to offset the amount of the Louisville city loan.

The earnings for the year were :

	1884-85	1883-84.	Inc. or Dec.	P.c.
Earnings	$13,936.346	$14,351,093	D. $414,747	2.9
Expenses	8,182,255	8,822,782	D. 641,527	7.3
Net earnings	$5,754,091	$5,527.311	I. $226,780	4.1
Gross. earn. per mile	6,775	6.950	D. 175	2.5
Net earn. per mile	2,797	2,677	I. 120	4.5
Per cent. of exps	58.7	61.5	D. 2.8	....

The gross earnings per mile last year were the largest ever reported, with the exception of those for 1883-84. The net earnings per mile were larger than for several years past.

The earnings of the main stem and branches were $3,636,-065; expenses, $1,705,185; net earnings, $1,930,880; surplus over all charges, $411,232.

The result of the year was as follows :

Net earnings, as above		$5,754.091
Income from investments		198 592
Total		$5,952,683
Interest, rentals, etc	$4,215.948	
Taxes	379,845	
		4,595,783
Balance, surplus for the year		$1,356.890
New construction	$154,810	
Sinking fund payments	267,740	
Car trust bonds	304,658	
Advances to leased lines	388,214	
" " Pensacola & Atlantic	279,038	
		1,394,460
Excess of payments		$37,570

Advances to the Pensacola & Atlantic are secured by $1,000,000 land grant bonds of that company held.

A general statement of the operations of the year is given and is summed up briefly as follows :

Net income over interest, etc	$1,356,890
Received from sale of bonds	4,436,102
" " " " stocks	1,086,336
Sundry receipts in settlement balances due	762,728
Total	$7,642,056
Sundry bonds purchased	$1,537,225
Stock purchased	135,160
Mortgage debt redeemed	1,102,198
Floating debt reduced	3,794,862
Addition to cost of road	154,810
Advances, leased and controlled lines	667.252
Increase in cash on hand	107,397
Transportation Department	87,459
Sundry items	55,693
	7,642.056

The statement says : "The result of the year's business has been very satisfactory, and while there has been a decrease of $414,746 in the gross earnings, the net earnings show an increase of $226,780. This has not been accomplished at the sacrifice of your road, as its physical condition has been improved.

"The annual report will show that over 10,000 tons of steel rails have been put in the track during the fiscal year, and charged to operating expenses. Contracts have been made for the delivery of 20,000 tons of steel rails during the ensuing fiscal year; this will be sufficient to put your entire main line of 1,757 miles in steel.

"The reduction of the floating debt, the large amount of assets in the treasury, and the improvement in the credit of your company is most gratifying."